The Role of Education and Hands-on Training in Emergency Preparedness and Response

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Thuy Hang T Doan

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Debra Olson

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Dedication

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Abstract

Natural disasters, such as Hurricane Katrina and manmade catastrophes such as the terrorist attacks on the World Trade Center have tested the public health response capabilities of the United States. While each disaster be it natural or manmade will have different characteristics; however, they require the same all-hazards response. This type of response, education and training of the public health workforce serves to prepare them for an effective response to any potential public health threat. While it is essential for public health professionals to receive effective preparedness education and training, it is also crucial that learned knowledge and skills are retained and regularly applied to individual and/or organizational performance capability.

The purpose of this process and outcome cross-sectional retrospective study is to evaluate training effectiveness of the Centers for Disease Control & Prevention Division of Strategic National Stockpile Training Program (SNS). The SNS training program is part of a nationwide preparedness training and education program for employees of state and local health departments, emergency management agencies, health care providers, as well as other first responders. The goal of this research study was to examine whether the SNS training program impacted individual behavior and/or organizational performance in emergency preparedness and response. This survey assessed participants' overall reaction to the training course; knowledge including retention and/or decay; participant-reported behavior change within their response role; and participants' self-reported contribution to improving organizational performance.

For the purposes of this research, a survey adapted from Kirkpatrick's learning and training evaluation theory was designed, pilot tested, and validated with internal consistency reliability calculations. Correlation from the pilot study showed high internal reliability (>0.70 Cronbach's alpha) for the reaction, learning, and behavior construct. The results construct showed an insufficient Cronbach's alpha coefficient. A total of 93 participants responded to the pilot study and a total of 342 (229 from SNS training, 62 from MPC training, and 51 from MAD training) participants responded to the full study.

This evaluation research study has provided significant findings on the effectiveness of the Strategic National Stockpile Training Program. Overall, participants responded positively about their reaction of their overall experience and the knowledge and skills learned from the training course. In general, individuals with less prior knowledge in the SNS, Mass Mobile Preparedness Training (MPC), or Mass Antibiotic Dispensing (MAD) training course gained more knowledge through the training course. More than 70% of respondents had applied knowledge and skills learned from the training course to their response role and/or their organization's response capabilities. Knowledge retention was not significantly different across course years among respondents of the SNS, MPC, and the MAD courses.

This research study reinforced that evidence-based training is a key component of preparedness planning and response activities designed to effectively prepare for, respond to and recover from public health emergencies and natural disasters. The overall findings obtained from this study can be used to improve the effectiveness of the SNS training program. They are also useful for reinforcing the impact of training to improve public

health preparedness to funding sources in both the public and private sector. In addition, information collected also provides critical data for evaluating the progress and performance of the CDC DSNS training program. These findings provide baseline data for policy makers to evaluate existing programs in order to determine further continuation and/or expand successful programs and eliminate or modify ineffective ones. This three-part survey questionnaire is a step forward in providing information and resources for standardizing program evaluation for the CDC DSNS training program as well as state public health agencies for training evaluation efforts.

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Abbreviations and Acronyms

CDC	Centers for Disease Control and Prevention
CRI	Cities Readiness Initiative
DSNS	The Division of Strategic National Stockpile
EUA	Emergency Use Authorization
MAD	Mass Antibiotic Dispensing Training Course
MPC	Mobile Preparedness Training Course
POD	Point of Dispensing
RSS	Receive, Stage, and Store
SNS	SNS Preparedness Training Course
SOP	Standard Operation Procedure

Chapter 1: Introduction

Natural disasters, such as Hurricane Katrina and manmade catastrophes such as the terrorist attacks on the World Trade Center have tested the public health response capabilities of the United States. The September 11th 2001 terrorist attacks across the United States resulted in 2,981 deaths and had both an immediate and long-lasting impact on the American people (1). Hurricane Katrina was the most expensive and one of the deadliest natural disasters in the history of the United States (2). The impact of Hurricane Katrina on individuals and communities was overwhelming and displaced approximately 400,000 residents across 18 states resulting in significant and widespread public health challenges (3). These two disastrous events have served to highlight the limitations of the United States public health system.

Any major natural or manmade disaster has the potential to uproot large segments of the U.S. population, cause massive infrastructure destruction, and pose significant public health threats (3). With climate change, natural disasters are likely to become more frequent and severe (4) and may pose more severe consequences than disasters had in the past. In addition, some propose that bioterrorist attacks are unavoidable in the near future (5) and others suggest that the public health infrastructure in the United States is inadequately equipped to address such attacks (6–8). Two preparedness exercises, Dark Winter and TOPOFF, involved an intentional release of biological agents to examine the public health, governmental, and health care response to an event of bioterrorism (9; 10) and have found significant weaknesses in the US public health system that may prevent an effective response to a future bioterrorism event (9–14).

The federal government has recognized the need for improving the overall public health disaster preparedness and response system in order to effectively prepare for and respond to large-scale disasters. Since the terrorist attacks of 2001, the federal government has moved toward an all-hazards model of public health emergency readiness. In this approach, health departments are expected to respond efficiently to a broad spectrum of intentionally caused and naturally occurring large-scale disasters that have an impact on the public's health (15). As a result, there has been increased support and funding for terrorism emergency response and all-hazard preparedness training among health professionals since the terrorist attacks in 2001 (6; 16–21). In fiscal years 2003 - 2004, the federal government has funded the states with over $2 billion to improve the public health preparedness system (22; 23). Additionally, since the Public Health Security and Bioterrorism Preparedness and Response Act established in 2002, more than $5 billion has been invested on public health preparedness activities with heavily focus on developing the workforce, enhancing organizational capacity, standardizing emergency procedures, and promoting individual and community-level preparedness (24).

In 1988, the Institute of Medicine's (IOM) Committee for the Study of the Future of Public Health has highlighted the need and urgency for extensive capacity building within the public health preparedness systems through training and education (25). In 2002, the Committee on Assuring the Health of the Public in the 21st Century reported major challenges within the public health preparedness system. Some of the challenges included a lack of training and reinforcements within the workforce, and incomplete

domestic preparedness and emergency response capabilities (26). Furthermore, in 2010, the Healthy People 2010 has re-documented these priorities by stating "there is an ongoing need to train and educate people who are currently employed in public health as new areas, problems, threats, and potential disasters emerge" (27). In addition, the Public Health Workforce: An Agenda for the 21st Century and Strategic Plan for Public Health Workforce Development has addressed the need for training of the current public health workforce, charging local health agencies with the responsibility for fostering individual and organizational training and education (28; 29). As a result, federal agencies, public and private organizations, and academic institutions have collaboratively worked together to develop and revise emergency operations plans, and improve preparedness training programs, in addition to many other initiatives, to advance their readiness for disaster response (30).

Training the workforce is one of the most persistent methods for increasing the productivity of individuals and for communicating organizational goals (31). Many past studies have shown that continuous education and training is a process of updating knowledge, developing skills, bringing about attitudinal changes, and improving responders' emergency competencies to better perform their job efficiently and effectively during an incident (32; 33). A literature review analyzed 303 articles in public health preparedness published from 2002 – 2007 found that training in public health preparedness was discussed in 80 of the 303 articles (34–37); this result demonstrates a continued high level of interest in training to acquire knowledge and skills

in this field. An additional study showed that 85% of 291 survey respondents from local health departments expressed the need for training (38).

No two natural or manmade disasters pose the same infrastructure and public health threat and/or require the same exact method of response; therefore, it is crucial that public health and emergency response professionals are equipped with the necessary knowledge and concepts of disaster preparedness and to regularly implement those practices into routine exercises prior to the occurrence of an actual event. Several studies have demonstrated that if trainees are not exposed to critical events on a regular basis, their knowledge and skills in responding to such events will start to decline 6 – 12 months after the initial training (39). In addition, it is critical that anyone involved in disaster response have a fundamental base of knowledge and skill set (40–43). Nevertheless, because of the rarity of major public health threats, it often remains unknown whether initial training objectives were met and contribute to an actual response incident.

Although it is essential for public health professionals to receive effective preparedness education and training, it is also crucial that the knowledge and skill sets are both retained and regularly applied to the individual and/or organizational performance capability. As training efforts across agencies increase, it is also increasingly essential to evaluate these training efforts to determine if training objectives are met, and if any have contributed to a more effective response. In addition, studies have indicated that training programs that utilize simulation and exercise methods can be effective in retaining the knowledge and skills and improving response to a real incident (44; 45). Unfortunately,

there are lack of literature discussing the evaluation components of disaster training and exercise. Therefore, there has been a call for more comprehensive and systematic evaluation in public health training initiatives (45; 46).

The remainder of this chapter will discuss the CDC DSNS training program and the layout of this research study.

The Centers for Disease Control and Prevention Division of Strategic National Stockpile Training Program

A large-scale natural disaster or a terrorist attack will require rapid distribution of large quantities of medications and medical supplies to treat and/or prevent disease among the affected population. The Centers for Disease Control and Prevention (CDC) the Division of Strategic National Stockpile (DSNS) is a national repository of essential life-saving pharmaceuticals and medical supplies designed to protect the American people in an event of manmade or natural health emergency such as terrorist attack, pandemic influenza outbreak, natural and/or manmade disaster. These pharmaceuticals and medical supplies are to be delivered to a declared site of a national emergency that is severe enough to deplete local supplies. The DSNS plays a critical role as a nationwide preparedness program for state and local health care providers, first responders, and governmental partners such as governors' offices, state and local health departments, and emergency management agencies (47).

In an effort to prepare state and local responders to effectively respond to any potential manmade or natural disaster, DSNS provides a variety of training courses in

emergency preparedness and response to the public health workforce, healthcare providers, and leaders in the public and private sector. These training courses are designed to explain the DSNS program's mission and operational concepts; in addition, it educates state and local emergency response officials about the important issues that must be planned and executed in order to receive, secure, and distribute the strategic national stockpile assets to effectively respond to a potential disaster (47).

Program evaluation is a critical component, yet is often overlooked, in determining whether goals and objectives have been achieved and in assessing anticipated and unanticipated outcomes (48). A study explored emergency preparedness knowledge, training, and resource needs among community-based professionals in Wisconsin. It found that general knowledge about weapons of mass destruction events and natural catastrophes appeared to be lacking for most first line professionals in the field (49). Furthermore, a few other research studies using a similar approach have found that first line professionals showed low scores regarding knowledge about the push packages, SNS stockpile, human induced disaster, and natural catastrophes (49–52).

The literature has long recognized the importance of and need for comprehensive, systematic evaluation to measure training effectiveness and to quantify if anticipated objectives were achieved (53; 54). Very few studies have meticulously evaluated the effectiveness of a national, federally funded training program. A literature search of 27 evaluation instruments was used to evaluate multiple aspects of preparedness for public health emergencies and found only four instruments targeted to evaluate national efforts in this area (55–58). In addition, most current studies focused only on the

process evaluation of the training program to determine the effect of a specific training program on increasing a particular knowledge base, rather than on outcome evaluation to determine whether a specific knowledge area is associated with improved disaster response (59). In a study that reviewed 303 articles that focused on public health preparedness from 2002 – 2007, only 20% of the 303 articles focused on evaluating programs and policies (37).

As part of the ongoing quality control activities for the CDC DSNS training program, a process and outcome evaluation for assessing effectiveness of the training programs was conducted. The three training courses that were included in this evaluation research study were the SNS Preparedness course, the Mobile Preparedness course, and the Mass Antibiotic Dispensing course.

The SNS Preparedness Training Course

The Strategic National Stockpile Preparedness training course is designed to educate and train local, state, and federal public health and emergency response personnel on how to effectively utilize and manage the strategic national stockpile resource in response to manmade, natural, or technological disaster. The course provides participants with specific knowledge on DSNS' levels of support, response concepts, planning and operational considerations for receiving, staging, and storing strategic national stockpile resources. In addition, the course also covers in-depth planning consideration for medical countermeasure dispensing campaigns including: regulator information about labeling regulations, operational considerations when investigational new drugs are use as part of

an emergency use authorization, point of dispensing site planning and operations. The DSNS provided approximately four, four-day training courses each year at the Centers for Disease Control and Prevention headquartered in Atlanta, Georgia. The class size is limited to 35-40 participants. The DSNS requires that participants have experience in planning or management positions with a public health agency, an emergency management agency, or a public safety agency; and, have some familiarity with the SNS stockpile to participate in the training course (60).

Mobile Preparedness Training Course

The Mobile Preparedness Course is designed to educate participants with information on the DSNS operational concepts, receiving, storing and staging requirements and procedures, and mass antibiotic dispensing. The course goals are to provide state, local and tribal officials with the knowledge, skills, and tools to receive, distribute, and dispense SNS assets. Participants learn about considerations and requirements for receiving, staging, storing, distributing, and dispensing of SNS stockpiles; essential elements of a point of dispensing and management structure; dispensing site setup, security considerations, volunteer recruiting, staffing, and management; and public information and communication. This training is a two-day course and is limited to 35 participants. Included participants are those in planning or management positions in public health or emergency management, who are familiar with DSNS response methods, and should be a point of dispensing manager. This training

course is offered at the request of states, with it being offered on average eight times a year (61)

Mass Antibiotic Dispensing Training Course

The Mass Antibiotic Dispensing is designed to provide Point of Dispensing (POD) managers, local and state planners, and POD staff members the knowledge, skills and tools necessary to dispense SNS stockpile medical supplies during a public health emergency. The course is being taught via presentations, group activities, discussions, and supporting materials to train participants about staffing, opening, and managing medical supplies at dispensing sites during a public health emergency. This course also provides a forum for discussing and information sharing to promote consistency and standardization in POD operations throughout a state. This training course is offered at the request of states, with it being offered on average eight times a year with a class size limited to 45 participants. The course is a two-day training course. Participants who come to this training course consists of the POD manager, state and local planner, or POD staff member who will be involved in mass antibiotic dispensing (62).

Purpose of the study

The purpose of this research study is to quantitatively evaluate the effectiveness and impact of education and hands-on training in disaster preparedness and response activities through three training courses being administered by the Centers for Disease Control and Prevention Division of Strategic National Stockpile training program.

Another objective for this research study is to evaluate if education and hands-on training programs have fostered retention of knowledge and have improved individual and/or system performance in public health disaster preparedness and response activities.

Kirkpatrick's Four Levels of Training Evaluation Model

Kirkpatrick's four levels of training evaluation model was utilized as an evaluation framework to develop survey questions. These four levels of evaluation are as follows: level one, reaction after the intervention on the participant's impression of the program; level two, evaluation of learning after the intervention on participants knowledge and/or skills gained from the program; level three, evaluation of behavior or performance change due to the intervention whether what was learned is being applied on the job; and level four, evaluation of results impact due to the intervention whether that application is achieving results to improve personal and system performance (63).

Kirkpatrick's model has served as the primary organizing design model for training evaluation in for-profit organizations for over thirty years (64). Many newer approaches to address training evaluation have been proposed in the past decades (65–67), however, Kirkpatrick's four level model of training evaluation and criteria continues to be the most popular in many disciplines (67). Kirkpatrick's four levels of training evaluation was used in this research study because it was conceptually most appropriate for the purpose and methodology of this study.

Research Aims & Questions

Research Aim 1. Assess participants' overall reaction to the training course in which they participated.

Question 1.1. How have participants reacted to the training course?

Research Aim 2. Examine content retention and/or content decrease by the group-year that the individuals participated in the training course (2006, 2007, 2008, 2009, 2010, 2011).

Question 2.1. What did the participants learn and remember from the training course?

Research Aim 3. Determine if participating made any individual behavior change within their response role after participating in the training.

Question 3.1. Did the participants do anything differently or apply anything new to their response role?

Research Aim 4. Examine if participants made any capabilities impact on their organization performance as a result of their new knowledge and skill sets.

Question 4.1. Did the participants do anything differently or apply anything new to their organization's response capabilities from what they learned from the training course?

Significance

This study is significant to the field of public health preparedness and response for several reasons. First, it reinforces that effective preparedness can possibly lead to effective disaster response and that could potentially decrease human morbidity and mortality following a disastrous event. This study addresses the current limitations that the public health preparedness system faces and highlights the need for further emphasis on evaluation of preparedness training programs. Second, the survey data allows us to further connect and understand the association between education, training and behavior change; specifically, on how the three components worked together to facilitate improvement in one's response role. Third, findings from this study will provide scientific data and recommendations for quality improvement for the Centers for Disease Control & Prevention training program. Fourth, findings could potentially have some influences on policy development and funding opportunities for the CDC DSNS and other training initiative in disaster preparedness and response. Overall, this research study could have a significant influence by providing evidence-based findings on the impact of education and training in the field of public health disaster preparedness and response.

Chapter 2: Development and Validation of a Survey Questionnaire to Measure Training Effectiveness of the Centers for Disease Control and Prevention Division of Strategic National Stockpile Training Program

Evidence based training is a key component of preparedness planning and response activities designed to effectively prepare for, respond to and recover from public health emergencies and natural disasters. Understanding the impact of evidence-based training is a research priority that is critical for continuing high standards in preparedness training. The Strategic National Stockpile Training Program is a type of preparedness and response training program that requires technical training and routine exercise of learned knowledge and skills. The overall impact of this training program is unknown. This process and outcome evaluation research project is the first attempt to evaluate the effectiveness of this national preparedness and response training initiative.

The primary objective of this chapter is to discuss the process of survey development and validation to measure training effectiveness of the Strategic National Stockpile, Mobile Preparedness Course, and Mass Antibiotic Dispensing training course administered by the Centers for Disease Control and Prevention Division of Strategic National Stockpile training program to obtain a measure that could be used to evaluate training effectiveness in emergency preparedness and response.

Methods

Survey questionnaire development

The survey development process began with the PI's participation in a one-week SNS training course at the CDC in Atlanta. Several meetings with the CDC DSNS

training team were convened to further understand the overall goals and specific needs for the survey evaluation. Learning materials from the three training courses were thoroughly studied and utilized to design three individual SNS, MPC, and MAD objective knowledge tests. Literature reviews also served as a strong foundation to design the survey. Kirkpatrick's four levels of training evaluation model was chosen as a framework to design and generate survey questions. The PI also consulted with several experts in program evaluation and survey design methods to further clarify the survey. After survey questions were designed, a group of experts from CDC DSNS provided feedback regarding survey questions and content validity for objective knowledge tests.

Multiple revisions of the survey materials were made, the initial instrument was then posted online and distributed to the DSNS training team for further testing and providing additional feedback on the clarity of the survey and content validity of the questions. Subsequent review and feedback suggested the elimination of 15 items and resulted in a final instrument that consists of 51 items for the survey questionnaire, 21 items for the SNS training course evaluation, 20 items for the MPC training course evaluation, 21 items for the MAD training course evaluation, and 23 items for the demographic characteristics information.

Description of items in the survey questionnaire, objective knowledge test, and demographic questionnaire

The survey questionnaire included Kirkpatrick's level one learning evaluation, and six items addressed the overall reaction and satisfaction of how well participants

liked the training course. For Kirkpatrick's level two evaluation, eight items described the degree to which participants gained the intended knowledge and skills based on their participation in the training course. In addition, three individual objective knowledge tests, one set of questions (20 – 21 item) for each type of course. These knowledge tests were not included as part of the 42-item survey questionnaire and analyzed separately. For Kirkpatrick's level three evaluation, nine items addressed the degree participants applied what they learned from the training course to their response role or their organization's response mission when they returned to their job. For Kirkpatrick's level four evaluation, 19 items addressed to what degree targeted outcomes occurred as a result of the training course and any subsequent reinforcement when participants returned to their job. A total of nine stand-alone questions were also included in the survey questionnaire to gather additional evaluation information of interest to CDC, but not part of the model constructs.

All survey questions measuring the reaction, learning, behavior, and result constructs were based on a Likert scale of 1 to 5 with answer choices such as very likely or very unlikely; a great deal of knowledge or no new knowledge; very significant or not at all significant; very eager or not at all eager.

A 22-item demographic questionnaire covered: which of the three training course participants attended, year(s) of participation, employment status after participation in the training course, age, gender, education level achieved, years worked in the current job position/response role/agency, and type of organization employed. Question styles

included multiple choice, open-ended questions, and spaces for comments and suggestions.

Internal Reliability Validation of Survey Questionnaire for Pilot and Full Study

Study participants for pilot study

The survey questionnaire was pilot tested with a sample of 250 individuals randomized from the total population of 500 participants who attended the SNS Preparedness training course at the Centers for Diseases Control and Prevention in Atlanta between 2005 – 2010 at the time of the pilot study (November 2010). Participants were invited to take a one-time cross sectional survey questionnaire, the SNS objective knowledge test, and a demographic questionnaire.

Study participants for full study

The survey questionnaire was completed by 342 participants for the full study (229 from SNS training, 62 from MPC training, and 51 from MAD training). These participants were solicited as a convenience sample of those who attended these three training courses sponsored by CDC DSNS between 2005 – 2011. Because SNS training was both sponsored and conducted by CDC, a denominator was available. The MPC and MAD conducted by states only allowed for invitation to participants without knowledge of the sample size.

Statistical methods

Since part of the goal of the pilot study was to help shape Kirkpatrick's constructs for the larger study, the goal of the statistical analysis was two-fold: 1) validate Kirkpatrick's constructs with internal consistency reliability, and 2) when necessary, help inform ways to improve Kirkpatrick's constructs either through the addition or removal of questions.

Internal consistency reliability measures the extent to which all the items in a test measure the same concept or construct and that it is connected to the inter-relatedness of the items within the test (68). Cronbach's alpha expressed as a number between negative infinity and 1 was used to measure the internal consistent reliability of the four Kirkpatrick's constructs with coefficients > 0.70 considered sufficient. Literature has reported the acceptable values of Cronbach's alpha ranging from 0.70 to 0.95 (69–71). Other studies has recommended a maximum Cronbach's alpha value of 0.90 (72). Other studies has suggested that a high value of Cronbach's alpha (>.90) may imply redundancies in the survey questions and show that the survey should be shortened (68). Calculating Cronbach's alpha has become common practice in medical education research when multiple-item measures of a construct are designed (68).

Due to poor initial Cronbach's alphas of the 'behavior' and 'results' constructs, principal component analysis was used to help identify survey items related to the 'behavior' and 'results' Kirkpatrick's constructs. Survey items with adequate factor loading > 0.40 were included in each construct. In order to reduce the number of

questions used in each Kirkpatrick's construct, the following algorithm was used for each construct:

1. For each question within the current construct, determine the Cronbach's alpha when an individual question is left out.
2. If there exists no question in the construct such that the Cronbach's alpha is increased by leaving it out, then stop. Otherwise, take out the question from the current construct that results in the largest increase in Cronbach's alpha.
3. Return to step 1.

Statistical analysis was performed using the statistical package SAS version 9.2. The University of Minnesota, Clinical and Translational Science Institute, Biostatistical Design and Analysis Center provided assistance with statistical analysis.

Results of Pilot Study - Validation of Survey Questionnaire

The 42-item survey questionnaire completed by 93 respondents in the pilot (SNS training only) out of a randomized sample of 250 was used for internal consistency reliability analysis and principal component analysis.

Table 1: Internal consistency reliability estimates of Kirkpatrick's construct for the SNS training course from 93 respondents in the SNS pilot study

	Initial analysis		After grouping & reduction of questions	
Construct	Number of questions	Cronbach's alpha	Number of questions	Cronbach's alpha
Reaction	6	0.83	5	0.91
Learning	8	0.82	5	0.88
Behavior	9	0.39	5	0.79
Results	19	0.68	4	0.52

Table 1 illustrates the internal consistency estimates for the survey questionnaire used in the pilot study. The initial analysis column presents the number of questions and Cronbach's alpha for each construct according to the initial grouping plan of question items. The after grouping & reduction of question items column illustrates the final set of questions and Cronbach's alpha for each construct.

After grouping & reduction of questions process, the reaction construct consisted of 5 items and resulted in an acceptable Cronbach's alpha of 0.91. The learning construct contained 5 items and resulted in an acceptable Cronbach's alpha of 0.88. The behavior construct comprised 5 items and resulted in an acceptable Cronbach's alpha of 0.79. Finally, the results construct consisted of 4 items and resulted in unacceptable Cronbach's alpha of 0.52.

Results of Full study – Validation of Survey Questionnaire

The 31-item survey questionnaire completed by 342 respondents (229 from SNS training, 62 from MPC training, and 51 from MAD training) for the full study out of 4610 participants in the convenience sample.

Table 2: Internal consistency reliability estimates of Kirkpatrick's construct for the SNS, MPC, & MAD training course from a total of 342 respondents in the full study

Construct	# of Questions	Cronbach's alpha		
		SNS	MPC	MAD
Reaction	5	0.95	0.83	0.97
Learning	4	0.94	0.73	0.94
Behavior	4	0.84	0.79	0.78
Results	4	0.19	-0.41	0.18

Table 2 highlights the internal consistency estimates calculation for the SNS, MPC, and MAD training courses survey questionnaire used in the full study. Only questions included in the after grouping and reduction of items process was included in the full study. Results showed high Cronbach's alpha (>0.70) for the reaction, learning, and behavior constructs in all three SNS, MPC, and MAD training courses. Cronbach's alpha was insufficient for the results construct in the SNS, MPC, and MAD training courses. A total of nine questions served as stand-alone questions were included in the survey, but were not included in the internal consistency calculation.

Table 3: Question items for the reaction, learning, behavior, and results constructs included in the full study

Construct	Number of questions	Question Items
Reaction		
	1	Overall, the training course met my expectations.
	2	The in-class lectures helped me understand the materials being presented in the training.
	3	The in-class group discussions helped me understand the materials being presented in the training.
	4	The hands-on components helped me remember the skills I learned from the training.
	5	Based on my experience with this training session, I would probably attend another training course from CDC DSNS.
Learning		
	1	The topics discussed were relevant to my response role.
	2	The topics discussed were relevant to my organization.
	3	The training experience was useful in my response role.
	4	The materials provided were useful resources for my response role.
	5	My performance was improved by attending this training course.
Behavior		
	1	To what degree do you think you applied the knowledge and skills learned from this training course to your response role?
	2	In general, how often have you used the knowledge and skills that you obtained from the training for your response role?
	3	How significant do you think the training was in changing the way you perform in your response role today?
	4	How significant do you think your new knowledge and skills have been to your organization's response mission?
	5	After the training course, how eager were you to apply the new knowledge and skills gained to your response role or your organization's response mission?
Results		
	1	Did your experience with this training course lead you to want to make changes to your organization’s response plans, SOP, processes, etc.?
	2	In the process of implementing the action items you previously indicated, did you encounter any organizational challenges that make it difficult?
	3	Did you encounter any organizational assistance or support that made the process easier?
	4	Do you think this training course helped you do a better job in completing the action(s) you selected in the previous question?

Table 3 shows the final set of questions and their corresponding construct used in the full study for the SNS, MPC, and MAD training course.

Discussion

Calculating Cronbach's alpha has become the common practice in medical education research when multiple-item measures of a construct are designed (68). Overall, Cronbach's alphas for the reaction, learning, and behavior constructs are acceptable for the SNS, MPC, and MAD training courses both in the pilot and full study. This result demonstrates high internal reliability across items within a construct that the survey questionnaire intended to measure.

The initial pilot survey questionnaire was lengthy and many of the respondents did not complete the survey. As a result, we reduced the number of required questions for all of the constructs as previous studies have shown that Cronbach's alpha could also be affected by the length of the survey (72; 73). The reduction of questions provided acceptable Cronbach's alphas for the reaction, learning, and behavior construct and produced a shorter survey. Unfortunately, the "results" construct delivered a very low Cronbach's alpha in the initial analyses and remained low after the reduction of questions.

On the learning construct, the initial number of questions comprised nine questions and delivered a Cronbach's alpha of 0.82. A reduction to five questions resulted in a Cronbach's alpha of 0.88; however, we have decided not to include these three questions in the full study survey to maximize straightforwardness and shortening of the survey. Disappointingly, one question from the learning construct was accidently excluded in the full study survey. However, the final four questions grouping have resulted in a higher Cronbach's alpha for the SNS and MAD course. Similarly, one

question from the behavior construct was also excluded in the full study. Nevertheless, the final four questions grouping have resulted in a higher Cronbach's alpha for the SNS and MPC, and slightly lower for the MAD course. These mishaps may be due to technical errors.

Cronbach's alpha for the results construct is insufficient with low and negative correlation coefficient. These phenomena may be due to a low number of questions, poor interrelatedness between items or a heterogeneous construct (68). Although many training evaluation initiatives have attempted to adopt the Kirkpatrick framework, very few have succeeded in their efforts beyond measuring the reaction level (74; 75). Likewise, studies have shown that very few research efforts have been made to collect information about the learning and behavior construct due to the difficulties of their methodology (76). The most often cited obstacles to moving beyond evaluations of trainees reactions are the lack of knowledge in developing the evaluation instruments and a lack of time and resources for developing the overall evaluation process (77).

Additionally, many training evaluations in organizations in past decades only focused on collecting reaction measures (78). In fact, more than 94% of business organizations evaluate training using reaction measures (79). Behavior criterions are generally operationalized by supervisor ratings or objective indicators of performance (31), measures like these are extremely difficult to obtain as it requires buy-in from supervisors and organizations.

There is little evidence to confirm if trainees responding positively about their overall reaction to the training course have any connection to the learning knowledge and

skills they learned from the course. Not only that, it is also very challenging to measure if they have made any changes or implemented anything new to their response role, or even, if there were any positive outcomes for their organization. Many past studies have addressed the limitation between the linkage of reaction criteria and the learning, behavior, and results criteria (74; 80–82). Many evaluation efforts have attempted to move beyond the traditional measure of only the reaction criterions, however, the reaction level remains the most basic and easily obtained information for many training programs. In fact, the American Society of Training and Development 2002 State of the Industry Report revealed that 78% of organizations surveyed reported using reaction measures, compared with 32% for learning, 9% for behavior, and 7% for results (75).

In addition, it is worthy to note that the fairly good internal consistency between the three constructs among the three courses indicate that these survey items may be useful for course evaluation at other agency partners that also conduct training for preparedness and response. There has been a lack of evaluation instruments established to measure training effectiveness in public health preparedness. A 2005 literature review describes the available 27 evaluation instruments used to evaluate multiple aspects of preparedness for public health emergencies. It has discovered that 14 of the evaluation instruments were issued before September 2001 and 13 were issues after 2011 (83). Of the 27 evaluation instruments reviewed, only four were issued by the state government (84–87) and ten by federal government agencies (27; 56; 57; 88–94).

Conclusion

Findings from this study showed that some parts of this survey might be useful for course evaluation at other agency partners that also conduct training for preparedness and response. This evaluation instrument is a step forward in providing information and resources for standardizing program evaluations. This framework can be utilized by the federal and state public health agencies for training evaluation efforts.

Chapter 3: A Pilot Evaluation of the Centers for Disease Control and Prevention Strategic National Stockpile Training Program – Strategic National Stockpile Preparedness Training Course – The Evidence Base for Effective Preparedness Training

Evidence based training is a key component of preparedness planning and response activities designed to effectively prepare for, respond to and recover from public health emergencies and natural disasters. Understanding the impact of evidence-based training is a research priority that is critical for continuing high standards of preparedness training. The Strategic National Stockpile (SNS) Training Program is a type of preparedness and response training program that requires technical training and routine exercise of learned knowledge and skills. The overall impact of this training program is unknown. This process and outcome evaluation research project is the first attempt to evaluate the effectiveness of this national preparedness and response training initiative.

The objectives of this chapter are to develop an assessment survey evaluation tool using Kirkpatrick's Learning and Training Evaluation Model to pilot test the survey with 250 past participants from the Strategic National Stockpile Preparedness training course to collect preliminary data on training effectiveness. Calculation for internal consistency reliability of the survey questionnaire is discussed in the previous chapter.

Strategic National Stockpile Preparedness Training Course

The Strategic National Stockpile Preparedness training course is designed to educate and train local, state, and federal public health and emergency response personnel on how to effectively utilize and manage the strategic national stockpile resource in response to a manmade, natural, or technological disaster. The course provides

participants with specific knowledge on DSNS' levels of support, response concepts, planning and operational considerations for receiving, staging, and storing strategic national stockpile resources. In addition, the course also covers in-depth planning consideration for medical countermeasure dispensing campaigns including: regulator information about labeling regulations, operational considerations when investigational new drugs are used as part of an EUA, and point of dispensing site planning and operations. The SNS sponsored approximately four, four-day training courses each year at the Centers for Disease Control and Prevention headquartered in Atlanta, Georgia. The class size is limited to 35-40 participants. The DSNS requires that participants have experience in a planning or management with a public health agency, an emergency management agency, or a public safety agency; and, have some familiarity with the SNS stockpile to participate in the training course (60).

Methods

Study Sample

A retrospective cross-sectional design with one wave of data collection was implemented. The study began with a randomized sample of 250 eligible individuals who attended the Strategic National Stockpile Preparedness (SNS) training courses given at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia between 2005 – 2010. A total of 250 participants were randomized from the population of 500 individuals who attended the SNS 2005 – 2010 at the time of the pilot using Excel function "=Rand()" (95). To begin the study, the DSNS training team lead sent a solicitation email with a direct link to the survey to 250 identified potential respondents.

The first page of the survey contained information describing the objectives and format of the survey, assurance of confidentiality, and contact information of the PIs. A total of 11 emails were returned due to invalid email addresses, resulted in a revised total of 239 potential responders.

Participants were invited to take a one-time cross sectional survey questionnaire, an objective knowledge test of the SNS training course, and a demographic questionnaire. Participation was voluntary and participants were not required to answer every question on the survey. When participants opened the survey link, they were presented with a full explanation of the study, procedures for assuring confidentiality and information about informed consent. By beginning the survey, participants acknowledged that they had read the informed consent information and agreed to participate in the research study. Participants were not compensated to participate in this study.

To maximize response rate, two follow-up emails were sent: the first was sent two weeks after the initial invitation email and the final was sent three weeks after the first follow-up email to 239 eligible participants requesting participants to complete the survey. Completing the in person SNS training and having internet access were the only requirements for participation. The web-based survey was administered and managed by the University of Minnesota, Health Survey Research Center. The survey was managed through a secure website and data was stored on a secure University of Minnesota server. Data collection ended in January 2011.

Survey Questionnaire

A three-part pilot survey questionnaire contained 42 questions regarding the SNS training received, 20 questions regarding the objective knowledge of the SNS, and 22 questions about demographic characteristics. The evaluation instrument was developed using a combination of methods such as the Kirkpatrick Model, literature review, and content expertise from the SNS training team. Kirkpatrick's learning and training evaluation model was used as a framework to develop this survey instrument. The four levels included: level 1, reaction to the training; level 2, learning the intended knowledge, skills, attitudes, and commitment of their participants in the training events; level 3, behavior change when they were back on the job; and level 4, results of the training event and subsequent reinforcement.

The objective knowledge test included questions regarding the overall objectives of the SNS training course. These included: the DSNS' levels of support, response concepts, planning and operational considerations for receiving, staging, and storing of SNS assets, planning considerations in medical countermeasure dispensing campaigns with regulator information about labeling, investigational new drug operation, point of dispensing site selection, volunteer staffing, and public information and communications.

Demographic information was obtained such as primary employer, number of years in current response role, type and number of previous trainings attended, history of education, job title, job category, level of primary work, where would the participant work during a response, years of experience, what is the participant's primary function in a response and geographic location.

Questions were multiple choice and open-ended questions for comments and suggestions. All survey questions measuring the reaction, learning, behavior, and result constructs were based on a Likert scale of 1 to 5 with answer choices such as: very unlikely to very likely; no new knowledge to a great deal of knowledge; not at all significant to all significant; and, not at all eager or to very eager. Participants were asked to select all of the response options in the question that were applicable. Each of the questions included a "not applicable" choice as well. The three-part survey required about 25 minutes to complete and was submitted anonymously. The survey and research methodology was submitted for review to the Institutional Review Board of the University of Minnesota and was granted an exemption.

An expert panel at the CDC DSNS evaluated the survey instrument for content validity. Multiple revisions were made based on the review and recommendations. A selected group of staff members from the CDC DSNS training group was invited to test the survey and provide feedback before the launch of the survey.

Statistical analysis

Respondents with missing values were excluded from analysis. Frequency tables were generated from data analysis for all multiple-choice questions. Descriptive statistics were calculated to summarize characteristics of study participants included proportions for categorical and discrete characteristics. Demographic information about the respondents was analyzed separately. Knowledge scores for each course were calculated as the sum of the number of correct course knowledge questions for each participant.

Analysis of variance (ANOVA) was used to identify associations between knowledge scores and categorical variables (e.g., self-reported prior knowledge, knowledge gained, knowledge remembered). Pearson's chi-square was used to identify associations between continuous variables (e.g., knowledge scores and learning construct scores). Chi-square tests were used to identify associations between categorical survey items. Significance level alpha < 0.05 was used for all tests to identify significant associations. The denominator for percentages was calculated using the number of individuals who responded to specific questions (excluding missing answers).

Statistical analysis was performed using the statistical package SAS version 9.2. The University of Minnesota, Clinical and Translational Science Institute, Biostatistical Design and Analysis Center provided assistance with statistical analysis.

Results

Table 4: Characteristics of the most recent training course attended, year attended, and employment changes from 93 respondents in the SNS pilot study

		N	Percent
Most recent training course attended			
	Strategic National Stockpile	93	86.9%
Year completed most recent training course	2006	9	9.9%
	2007	16	17.6%
	2008	12	13.2%
	2009	25	27.5%
	2010	29	31.9%
Since attended most recent training course:			
Still working in the same emergency response role	Yes	78	83.9%
	No	15	16.1%
Still working at the same organization	Yes	89	96.7%
	No	3	3.3%

Of the 239 potential responders, 107 participants responded to the survey, however due to the survey design, incorrect choices of the training course taken, and missing answers from survey questions, resulted in only 93 surveys being included in analysis. A total of 38.9 % (n = 93) respondents indicated Strategic National Stockpile Preparedness training course as their most recent training course attended and 31.9% (n = 29) attended the training in 2010. Fourteen of the 107 respondents were not part of the targeted population and were excluded from analysis. Since the time respondents participated in the most recent training course, 83.9% (n = 78) responded as still working in the same emergency response role and 96.7% (n = 89) responded as still working at the same organization.

Table 5: Demographic characteristics of respondents in the SNS training course from 66 respondents in the SNS pilot study

		N	Percent
Gender			
	Male	33	50.0%
	Female	33	50.0%
Age			
	18-29	9	13.6%
	30-39	15	22.7%
	40-49	20	30.3%
	50-59	14	21.2%
	> 60	8	12.1%
Race/ethnicity			
	White	52	80.0%
	Black or African American	8	12.3%
	Asian	2	3.1%
	Native Hawaiian or Pacific Islander	2	3.1%
	Alaskan Native or American Indian	1	1.5%
Education			
	High School	3	4.5%
	Associates	1	1.5%
	Bachelors	27	40.9%
	Masters	29	43.9%
	Doctoral	2	3.0%
	Other	4	6.1%

A total of 71.0% (n = 66) completed the demographic questionnaire. Of those who have responded: 50.0% (n = 33) were male and 50.0% (n = 33) were female; 53.0% (n = 35) were 30 – 49 years of age; 80.0% (n = 52) were white; 40.9% held a bachelor degree; and 43.9% (n = 29) held a master's degree.

Table 6: Employment characteristics of respondents for the SNS training course in the pilot study

		N	Percent
Level of Government currently working	City	8	12.1%
	County	14	21.2%
	Regional	8	12.1%
	State	34	51.5%
	Federal	1	1.5%
	Not Government	1	1.5%
Type of Agency currently working	Emergency Management	3	4.5%
	Public Health	57	86.4%
	Law Enforcement	1	1.5%
	Military	1	1.5%
	Hospital/Treatment Center	1	1.5%
	Other	3	4.5%
Length of time working at current agency	Less than 1 year	4	6.1%
	1 – 5 years	41	62.1%
	5 – 10 years	10	15.2%
	10 – 15 years	5	7.6%
	15 – 20 years	2	3.0%
	20+ years	4	6.1%
Length of time working in current position	Less than 1 year	11	16.7%
	1 – 5 years	43	65.2%
	5 – 10 years	9	13.6%
	10 – 15 years	1	1.5%
	15 – 20 years	1	1.5%
	20+ years	1	1.5%
Length of time working in emergency response	Less than 1 year	2	3.0%
	1 – 5 years	33	50.0%
	5 – 10 years	17	25.8%
	10 – 15 years	2	3.0%
	15 – 20 years	3	4.5%
	20+ years	9	13.6%
Area of work during an emergency response	Point of Dispensing	16	23.9%
	State or local E.O.C	36	53.7%
	Receipt, Store, & Distribute Facility	23	34.3%
	Treatment Center	3	4.5%
	Others	14	20.9%
	Combination of areas	19	20.43%
Primary function in an emergency response	Planner	10	15.2%
	Supervisor/Manager	15	22.7%
	Coordinator	23	34.8%
	Inventory Management	3	4.5%
	Other	15	22.7%

In regard to employment characteristics, 51.5% (n = 34) reported as were currently working for a state level of government at the time of completing the survey; 86.4% (n = 57) worked in a public health type of agency; 62.1% (n = 41) had worked at the current agency for 1 – 5 years; 65.2% (n = 43) had worked at their current position for 1 – 5 years; 50.0% (n = 33) had worked in emergency response for 1-5 years; 53.7% (n = 36) had worked at a state or local emergency operation center during an emergency response; and 34.8% (n = 23) served as a coordinator as their primary function in an emergency response.

Level 1: Reaction

Table 7: General reaction on participants' satisfaction from respondents of the SNS training course in the pilot study

		N	Percent
Training course met expectations			
	Strongly Disagree	1	1.1%
	Disagree	2	2.2%
	Neither Agree or Disagree	2	2.2%
	Agree	32	35.2%
	Strongly Agree	52	57.1%
	Not Applicable	2	2.2%
In-class lecture helped understand the materials being presented in the training			
	Strongly Disagree	1	1.1%
	Disagree	1	1.1%
	Neither Agree or Disagree	1	1.1%
	Agree	37	40.7%
	Strongly Agree	50	54.9%
	Not Applicable	1	1.1%
In-class group discussion helped understand the materials being presented in the training			
	Strongly Disagree	1	1.1%
	Disagree	--	--
	Neither Agree or Disagree	2	2.2%
	Agree	31	34.1%
	Strongly Agree	56	61.5%
	Not Applicable	1	1.1%
Hands-on components helped remember the skills learned from the training	Strongly Disagree	2	2.2%
	Disagree	--	--
	Neither Agree or Disagree	4	4.4%
	Agree	22	24.2%
	Strongly Agree	62	68.1%
	Not Applicable	1	1.1%
Will attend another training course from CDC DSNS base on experience with this training course	Strongly Disagree	1	1.1%
	Disagree	1	1.1%
	Neither Agree or Disagree	2	2.2%
	Agree	18	19.8%
	Strongly Agree	66	72.5%
	Not Applicable	3	33.3%
*Will recommend this training course to colleagues			
	Strongly Disagree	2	2.2%
	Disagree	1	1.1%
	Neither Agree or Disagree	2	2.2%
	Agree	17	18.7%
	Strongly Agree	67	73.6%
	Not Applicable	2	2.2%

**Stand alone question, not a part of the Reaction construct*

Regarding general reaction and satisfaction for the SNS training course: 57.1% (n = 52) of respondents strongly agreed that the training met their expectations; 54.9% (n = 50) strongly agreed that in-class lectures helped them understand the material being presented in class; 61.5% (n = 56) strongly agreed that in-class group discussions helped them understand the materials being presented in class; 68.1% (n = 62) strongly agreed that hands-on components helped them remember the skills they learned from the training; 72.5% (n = 66) strongly agreed that they would attend another training course from CDC DSNS based on their experience with this training course; and 73.6% (n = 67) strongly agreed that they would recommend this training course to their colleagues.

A total of 38% (n = 35) respondents provided comments in regard to their general reaction and satisfaction about the training course via an open and ended question.

Some of the positive comments included: "Overall the course structure worked very well and presenters were experienced and knowledgeable. I really appreciated the open discussions; they were helpful in providing a different perspective on the prophylaxis of the public. Each state has different mandates/laws/guidelines and so it makes it interesting to hear how others operate their SNS/CRI."; "The hands on helped to drive home the concepts discussed."; "It helped to understand the national perspective and the practical aspects of receiving the SNS.";"I think the in-class lectures are vital to being able to perform the practical exercises, although it is actually the practical exercise that make the info sink in."; "The hands on training is fabulous, and really helps to give a better sense of how the SNS works."; "The SNS Program Preparedness Course was the best CDC training I've had in the 5 years I have served in an emergency response

capacity."; "It might be beneficial to have one course geared for state level, and another geared towards local level."; "I learned a great deal from the SNS Prep Course. I received great material on RSS site set up and learned a great bit more about the whole process outside of just my piece in activation."; "The course was excellent. The CDC staff and guest speakers kept our interest through varied classroom instruction and hands on sessions. In addition, we had the opportunity to get to know Emergency Response leaders from a number of disciplines. This is an amazing network both the instructors and the participants."; and last "The course provided me an understanding of the operational characteristic and capabilities of the SNS. For me it was a great experience to learn how to run the RSS operations."

Some of the suggestions for improvement included: "Much of the course material seemed to be directed towards an audience who have had little to no exposure to SNS concepts. Much, if not all, of the students who attended the course with me were already well into their SNS-related roles. Much of basic SNS theory and concepts presented were already well understood. Perhaps if the course went more in-depth into SNS best practices and the various antibiotic distribution models the course would have been more geared towards what I was expecting."; and last "It was not relevant for California. The other states the SNS is being handled by the state. Our state is breaking up the SNS and giving it to us not in the containers you train in or using the color scheme."

Relationship between SNS objective knowledge questions and overal reaction of the SNS training course

An ANOVA analysis was performed to test for differences in positive reaction and questions regarding SNS self-reported amount of prior knowledge, knowledge gained, and knowledge remembered. Participants with less prior SNS knowledge resulted in a more positive reaction from the training course (p-value = 0.02). In addition, respondents with more SNS knowledge gained (p-value = 0.00) and respondents with more SNS knowledge remembered (p-value = 0.01) also showed more positive reaction of the training course.

Level 2: Learning

Table 8: General reaction to the learning content from participants of the SNS training course in the pilot study

		N	Percent
Topics discussed were relevant to response role			
	Disagree	1	1.1%
	Neither Agree or Disagree	1	1.1%
	Agree	42	46.2%
	Strongly Agree	47	51.6%
Topics discussed were relevant to organization			
	Neither Agree or Disagree	2	2.2%
	Agree	24	26.4%
	Strongly Agree	65	71.4%
Training course enhanced knowledge of problem solving for response role	Disagree	2	2.2%
	Neither Agree or Disagree	5	5.5%
	Agree	38	41.8%
	Strongly Agree	46	50.5%
Training course enhanced knowledge of decision making for response role	Disagree	2	2.2%
	Neither Agree or Disagree	6	6.6%
	Agree	35	38.5%
	Strongly Agree	48	52.7%
Materials presented were appropriate for skill level	Disagree	2	2.2%
	Neither Agree or Disagree	8	8.8%
	Agree	32	35.2%
	Strongly Agree	49	53.8%
Training experience was useful for response role	Neither Agree or Disagree	4	4.4%
	Agree	38	41.8%
	Strongly Agree	49	53.8%
Materials provided were useful resources for response role	Disagree	1	1.1%
	Neither Agree or Disagree	4	4.4%
	Agree	39	43.3%
	Strongly Agree	45	50.0%
	Not Applicable	1	1.1%
Performance in emergency response was improved by attending this training course	Neither Agree or Disagree	8	8.8%
	Agree	40	40.0%
	Strongly Agree	42	46.2%
	Not Applicable	1	1.1%

Regarding the learning content from the most recent SNS training course taken: 51.6% (n = 47) of respondents strongly agreed that topics discussed were relevant to their response role; 71.4% (n = 65) strongly agreed that topics discussed were relevant to their organization; 50.5% (n = 46) strongly agreed that the training course enhanced their knowledge of problem solving for response role; 52.7% (n = 48) strongly agreed that training course enhanced their knowledge of decision making for response role; 53.8% (n = 49) strongly agreed that the training experience was a useful resource for their response role; 50.0% (n = 45) strongly agreed that the materials provided were useful resources for their response role; and 46.2% (n = 42) responded strongly agree that their performance was improved by attending this training course.

A total of 15.4% (n = 14) participants provided specific comments about the content of the training course via an open and ended question. Some comments included: "I have been working in my position as CRI Coordinator going on two years, but after taking this course I learned so much that I was able to bring new ideas to my team to implement, such as considering to revise our client prophylaxis form."; "The hands-on RSS training piece was the most helpful piece of the course. Also, the group breakout sessions to design and run a POD was really helpful. Both of those class times led to this course being useful and successful for me"; "The materials were useful but I have not referred to them since the training. I'm not a POD specific planner so I can't directly think of a way my day to day performance was improved, although I think generally by understanding the POD Planning Process it improves my ability to plan for other programs."; "One of the most valuable portions of the training was the networking with

other SNS professionals and hearing about what they are doing in their states."; "The CDC team did a great job with providing an overview of the SNS response so that we have an understanding when we participate in an actual response. We divided into teams and participated in exercises."; "Hands on and role playing was useful."; and last, "The CDC team did a great job of providing an overview of the SNS so that we understand various components even though we probably won't be involved in some areas, such as the RSS, during an actual response."

Table 9: Self-reported amount of prior SNS knowledge, knowledge gained, and knowledge remembered from respondents in the SNS pilot study

		N	Percent
*Prior SNS knowledge			
	None/Very Little Knowledge	13	14.4%
	Some Knowledge	52	57.8%
	A Lot Knowledge	19	21.1%
	Great Deal Knowledge	6	6.7%
*New SNS knowledge gained			
	Some Knowledge	18	20.0%
	A Lot Knowledge	51	56.8%
	Great Deal Knowledge	21	23.3%
*SNS knowledge remembered			
	Some Knowledge	19	21.1%
	A Lot Knowledge	55	61.0%
	Great Deal Knowledge	16	17.8%

**Stand alone question, not a part of the Learning construct*

Of the 93 respondents that completed the survey, 96.8% (n = 90) provided responses about how they felt their SNS knowledge before, during, and after the training course. In regard to SNS knowledge, 57.8% (n = 52) indicated that they had some prior SNS knowledge before attending the training course; 56.8% (n = 51) of respondents gained a lot of new knowledge during the training course; and 61.0% (n = 55) reported that they still remembered a lot of knowledge from the training course.

In addition, of the 52 respondents reported as having some prior SNS knowledge before attending the training course, 78.4% reported that they had gained a lot of knowledge compare to those respondents with a lot of or a great deal of prior SNS knowledge. Likewise, 51 respondents as having a lot of SNS knowledge gained from the training course reported that they still remembered a lot of SNS knowledge.

Additionally, SNS knowledge questions were significantly associated with questions in the learning construct. The results indicated that the less prior SNS knowledge that a participant had, the more positive the response was the SNS training course. Overall, there was a more positive response from those who had gained and/or remembered more SNS knowledge. However results from the ANOVA showed that SNS knowledge test scores were not significantly associated for any of the SNS prior knowledge (p-value = 0.64), knowledge gained (p-value = 0.48), and knowledge remembered (p-value = 0.38) questions.

An analysis was performed to measure the association between the SNS objective knowledge questions and demographic characteristics with the questions in the behavior construct. Age was the only demographic variable with a significant relationship (p-value = .04) with questions in the behavior construct.

Topic and/or learning item(s) that one could still remember

When asked about the most important topic and/or learning item(s) from the SNS training course that they could still remember, 85.0% (n = 77) of respondent provided a brief description of that content. Some of the thematic topics and/or learning item(s)

included: the overall concepts and formulation of the SNS; RSS management and inventory control/distribution; POD planning, set up and process; components that local agencies must be prepared to be able to receive, stage, and move the assets from the SNS and be able to do so in a timely manner; how to engage the community in response planning; setting up a dispensing site based on a given scenario; perform pediatric supply data analysis; process to receiving, storing, stocking, staging and distributing the SNS; and, how to talk with potential RSS site volunteers; developing POD site-specific floor plans, conducting site visits, and establishing appropriate staffing levels for supply management.

Table 10: Total number of correctly answered SNS knowledge questions from 66 respondents in the pilot study

Year	Mean	SD	Minimum	Maximum	P-value
2006 – 2008	16.1	2.9	8	20	0.21
2009	17.3	1.8	12	20	
2010	16.5	2.3	9	20	
Average of all years	16.7	2.4	8	20	

**Stand alone question, not a part of the Learning construct*

Overall, 66 of respondents fully completed the SNS knowledge questions. The overall mean of correctly answered SNS knowledge questions for 2006 – 2008 was 16.1; 2008 was 17.3, 2010 was 16.5, and overall for five years was 16.7. An ANOVA was performed and found that SNS knowledge remembered was not significantly different (p-value = 0.21) across course years among respondents.

Level 3: Behavior

Table 11: The degree in which participants applied knowledge and skills learned from the training course in their job from respondents in the SNS pilot study

		N	Percent
Degree one thinks he/she applied knowledge and skills learned from training course to response role	Very little application of knowledge and skills	4	4.4%
	Some application of knowledge and skills	29	32.2%
	A lot of knowledge and skills applied	45	50.0%
	A great deal of knowledge and skills applied	12	13.3%
Frequency one used knowledge and skills learned from the training to response role	Never	2	2.2%
	Sometimes	41	46.1%
	Frequently	38	42.7%
	Always	8	9.0%
Significance of the training in changing the way he/she performed in response role today	Very significant	16	18.0%
	Somewhat significant	22	24.7%
	Significant	37	41.6%
	Not very significant	14	15.7%
Significance of the new knowledge and skills gained to organization's response mission	Very significant	23	25.8%
	Somewhat significant	19	21.3%
	Significant	34	38.2%
	Not very significant	12	13.5%
	Not at all significant	1	1.1%
*Application of knowledge and skills learned from the training course to an emergency situation or event	Yes	47	52.8%
	No	42	47.2%
*Knowledge and skills gained from the training allowed one to respond to an emergency event more effectively	Yes	43	91.5%
	No	--	--
	Maybe	4	8.5%
How eager one was to apply new knowledge and skills gained to response role or organization's response mission	Very eager	38	42.7%
	Somewhat eager	34	38.2%
	Neutral	17	19.1%

**Stand alone question, not a part of the Behavior construct*

Regarding the application of knowledge and skills learned from the training course to one's response role, 50% (n = 45) have reported applying a lot of knowledge and skills learned from the training course to their response role; 46.1% (n = 41) indicated as to sometimes applying those knowledge and skills learned in the training to their response role; 41.6% (n = 37) reported that the knowledge and skills gained from the training course was significant in changing the way he/she performed in their response role today; and 38.2% (n = 34) reported that the knowledge and skills gained from the training course was significant to their organization's response mission.

Of the 52.8% (n = 47) of respondents that reported applying the knowledge and skills learned from the training course to an emergency situation or event, all of them provided comments on the type of events that the SNS knowledge and skills were applied. A total of 74.5% (n = 35) indicated H1N1 pandemic response, others responded to an emergency situation/event included: mass vaccination clinics, exercised coordination, hurricane Gustav, flooding and fire (non-SNS response, but still utilized RSS and POD principles), reviewed procedure for POD Command and Control elements, assisted counties with planning, assisted with 2009 Inauguration, activated and operated state RSS facility.

A total of 91.5% (n = 43) indicated that the knowledge and skills gained from the training course allowed them to respond to an emergency event more effectively. In addition, 42.7% (n = 38) replied that they were very eager to apply new knowledge and skills gained from the training course to their response role or organization's response mission.

Relationship between current employment position, emergency response position, and action applied to response role and/or organization's response capabilities

Of the 81.9% (n = 54) of respondents who have worked in their current employment position for less than 5 years, more than 77.0% indicated that they had applied something new to their response role and/or to their organization's response capabilities and 71.4% indicated that it took them less than six months to implement those actions.

Of the 53.0% (n = 35) who have worked in emergency response for less than 5 years, more than 91.0% (n = 32) indicated that the training was significant in changing the way they have performed in their response role. Of the 46.9% (n = 31) respondents who were in emergency response for more than 5 years, 74.2% (n = 23) indicated that the training was significant in changing the way they performed in their response role.

Relationship between objective SNS knowledge questions and behavior change

SNS subjective knowledge questions were significantly associated with question group in the behavior construct. Results indicated that the less prior SNS knowledge a participant had, the more likely they made changes or implemented something new in their response role or organization's response mission when they returned to their job (p-value = 0.02). In addition, results also indicated that those who had gained more SNS knowledge (p-value = <0.001) and those that had remembered more SNS knowledge (p-value = <0.001) also were more likely to make changes or implement something new in their response role or organization's response mission.

Level 4: Results

Table 12: Action taken by participants as a result of attending the SNS training course in the SNS pilot study

		N	Percent
Experience with this training course lead one to want to make changes to organization's response plans, SOPs, processes, etc.	Yes	48	53.9%
	No	17	19.1%
	Maybe	24	27.0%
*Information from the training course stimulated one to implement something new to response role or organization response operations	Yes	61	70.1%
	No	26	29.9%
*Applied something differently or applied something new to response role or organization's response capabilities	Yes	66	75.0%
	No	22	25.0%
*Length of time after the training course the action in the previous question was applied	Immediately	12	18.5%
	Within 1-3 months	22	33.8%
	Within 3-6 months	13	20.0%
	Within 6-12 months	10	15.4%
	More than 1 year	2	3.1%
	More than 2 years	4	6.2%
	Other	2	3.1%
Encountered any organizational challenges in the process to apply something new	Yes	27	41.5%
	No	38	58.5%
Encountered any organizational assistance in the process to apply something new	Yes	24	37.5%
	No	40	62.5%
*Action taken as a result from taking this training course (select all that apply)	Developed an all-hazards emergency response plan	6	--
	Updated an all-hazards emergency response plan	32	--
	Planned strategic sites for RSS	35	--
	Planned sites for possible POD	44	--
	Conducted an exercise for POD	42	--
	Conducted a real event for POD	23	--
Training course helped do a better job in action(s) indicated previously	Yes	67	82.7%
	No	2	2.5%
	Maybe	11	13.6%

**Stand alone question, not a part of the Results construct*

About 53.9% (n = 48) stated that the experience with the SNS training course lead them to want to make changes to their organization's response plans, SOPs, processes. Also, 70.1% (n = 61) responded that the information obtained from the training course had stimulated them to implement something new to their response role or to their organization response operations.

Approximately 70.1% (n = 61) have applied something differently or something new to their response role or their organization's response capabilities; 60.0% (n = 57) provided comments on the the type of action that was applied. Some of the action included: worked on a Cities Readiness Initiative (CRI) strategy concept to accept and receive and distribute the SNS; developed SOGs; changed the state's mass dispensing form; made changes to some of the components on the state's response plan; re-wrote portions of the state's response plans; revised POD structure and obtained new equipments; executed drills and exercises with the state's Closed PODs; further developed county's plans for the CRI Jursidicition; identify an RSS site; updated training for local public health agencies; re-wrote the SNS operations plan, created an RSS Field Operating Guide, and worked with a State SNS Coordinator to design four trainings to help countries understand SNS concepts in a more advanced way; revised layout and structure of POD specific SOPs and Job Action Sheets; improved drive through process; improved risk communication models; revised warehouse operations; utilzied RealOpt Software to conduct simulations for POD planning activities; last but not least, modified organization's mass prophylaxis plan.

In contrast, 25.0% (n = 22) reported that they did not do anything differently or anything new to their response role or their organization's response capabilities. A total of 14% (n = 13) provided rationale for why they were not able to do anything new to their response role or their organization's response capabilities. Some rationale included: had no opportunity; not a part of one's response role; had already been operating well within the parameters dicussed in the course, the course only served to confirm that the state's repsonse plan is operating accordingly; and one was new to the team.

In regard to the length of time that action was implemented, 33.8% (n = 22) of respondents indicated that it took them within 1-3 months after the training course to apply something differently or something new to their response role or organization's response capabilities. A total of 58.5% (n = 38) did not encounter any organizational challenges during the process of applying something new. Nevertheless, 41.5% (n = 27) have encountered some challenges; 41.0% (n = 11) stated that resources were not available at their organization for the change and 33.3% (n = 9) indicated they already had too many projects and responsibilities. Some other rationale included: leadership understanding and buy-in was the biggest barrier; staff turnover; entrenched, bureaucratic inertia within organization; everyone already had too many projects with budget cuts; and management was not open to the changes.

A total of 62.5% (n = 40) who did not receive any organizational assistance in the process of applying something new; 37.5% (n = 24) received some organizational assistance in the process of applying something new; and 96.0% (n = 23) provided comments on what organizational assistance were received. Some comments included:

supportive management; regional team worked together; members of response team recognized the need for change; colleague also attended SNS training or similar training; organization was very supportive and worked well with all sections in the government including police, hospital, public health; support from SNS coordinator; and other team members buy-in.

Approximatey 88.0% (n = 81) had taken the following actions as a result of taking the SNS training course: n = 6 developed an all-hazards emergency response plan; n = 32 updated an all-hazards emergency response plan; n = 35 planned strategic sites for RSS; n = 44 planned sites for possible POD; n = 42 conducted an exercise for POD; and n = 23 conducted a real event for POD. Furthermore, 82.7% (n = 67) reported that the training course helped them do a better job in the actions indicated above.

Most effective components about the SNS training course

A total of 68.0% (n = 63) provided feedback on what they found most effective about this training experience. Some of the feedback included: "the hands on and the experiences of staff; actual work in a warehouse with simulated tools including equipment; group discussion; the experience of watching all the different disciplines from across the country working together; interaction with SNS coordinators/planners from many other states and hearing about their experiences; a combination of classroom and hands-on expereinces; and the discussion after the drill."

Most ineffective components about the SNS training course

A total of 34% (n = 31) provided feedback on what they found least effective about this training course. Some of the feedback included: "the material provided was for beginners and not for those who have worked in the SNS areas for years; the POD exercise; more presentation on logistics; more time to interact with colleagues from other states; presentation on the process to request SNS; long power point presentations; formulary sections; and limited colleagues from the same state."

Topics and/or activites to be included

Approximately 39.0% (n = 36) provided feedback on what other topics and/or activities they think should be included to make the SNS training more effective. Some of the feedback included: "more hands-on components; increase discussion about the Chempack program; discussion about the way other states handle the problems that arise during the planning phase; provide more information about the LTAR and how to apply it to existing plans; provide more ideas on how to enage and retrain volunters; how to build effective planning groups; training particpants present case studies of their POD plans/processes; provide refresher training every 5 years or a short online class; provide a presentation in public health law; ways to getting businesses involved as volunteers; role of local/state health department regarding strategic national stockiple management; and last but not least, alternate dispensing modalities."

Table 13: Relationship between Kirkpatrick's constructs and SNS objective knowledge test with prior SNS knowledge, new knowledge gained, and knowledge remembered in the pilot study

Variable			Mean	95% CI of Diff.	P-Value
Reaction	Prior SNS Knowledge	None/Very Little	23.5	Ref.	0.017
		Some	23.4	(-1.88, 1.84)	
		A Lot	22.2	(-3.41, 0.91)	
		Great Deal	19.5	(-6.93, -1.00)	
	New Knowledge Gained	Some	19.9	Ref.	<0.001
		A Lot	23.2	(1.79, 4.76)	
		Great Deal	24.8	(3.08, 6.56)	
	Knowledge Remembered	Some	21.2	Ref.	0.008
		A Lot	23.1	(0.29, 3.48)	
		Great Deal	24.4	(1.13, 5.20)	
Learning	Prior SNS Knowledge	None/Very Little	23.3	Ref.	0.141
		Some	22.7	(-2.12, 0.91)	
		A Lot	22.1	(-2.96, 0.55)	
		Great Deal	20.7	(-5.05, -0.24)	
	New Knowledge Gained	Some	21.1	Ref.	0.007
		A Lot	22.7	(0.32, 2.91)	
		Great Deal	23.5	(0.91, 3.98)	
	Knowledge Remembered	Some	21.4	Ref.	0.048
		A Lot	22.7	(0.06, 2.63)	
		Great Deal	23.3	(0.30, 3.63)	
Behavior	Prior SNS Knowledge	None/Very Little	10.1	Ref.	0.018
		Some	11.8	(-0.31, 3.66)	
		A Lot	10.7	(-1.65, 2.92)	
		Great Deal	14.7	(1.54, 7.61)	
	New Knowledge Gained	Some	13.7	Ref.	<0.001
		A Lot	11.6	(-3.76, -0.55)	
		Great Deal	9.7	(-5.94, -2.17)	
	Knowledge Remembered	Some	13.9	Ref.	<0.001
		A Lot	11.3	(-4.15, -1.07)	
		Great Deal	9.5	(-6.41, -2.37)	
Results	Prior SNS Knowledge	None/Very Little	2.9	Ref.	0.007
		Some	1.8	(-2.08, -0.15)	
		A Lot	3.1	(-0.99, 1.25)	
		Great Deal	1.5	(-2.95, 0.11)	
	New Knowledge Gained	Some	2.5	Ref.	0.318
		A Lot	2.0	(-1.41, 0.38)	
		Great Deal	2.5	(-1.02, 1.07)	
	Knowledge Remembered	Some	2.2	Ref.	0.268
		A Lot	2.1	(-0.97, 0.76)	
		Great Deal	2.8	(-0.45, 1.76)	
SNS Objective Knowledge Test	Prior SNS Knowledge	None/Very Little	17.3	Ref.	0.644
		Some	16.4	(-2.54, 0.66)	
		A Lot	17.0	(-2.35, 1.68)	
		Great Deal	17.0	(-2.90, 2.24)	
	New Knowledge Gained	Some	17.2	Ref.	0.477
		A Lot	16.8	(-2.01, 1.07)	
		Great Deal	16.1	(-2.92, 0.72)	
	Knowledge Remembered	Some	16.0	Ref.	0.384
		A Lot	17.0	(-0.44, 2.44)	
		Great Deal	16.6	(-1.35, 2.55)	

ANOVA results showed that there were significant relationships between the reaction construct and self-reported amount of prior SNS knowledge, new knowledge gained, and knowledge remembered. There were also significant relationships between the learning construct with new SNS knowledge gained and knowledge remembered.

For the behavior construct, there were significant relationships with prior SNS knowledge, new knowledge gained, and knowledge remembered. For the results construct, only prior SNS knowledge had significant relationship. For the SNS objective knowledge test, there were no significant relationships between any of the self-reported amount of SNS knowledge.

In summary, positive outcomes for the reaction and behavior constructs are associated with lower levels of prior SNS knowledge. In addition, positive outcomes for the reaction, learning, and behavior constructs are significantly associated with higher levels of knowledge gained and knowledge remembered.

Discussion

The response rate for this study was 38.9%. A meta-analysis of response rates for electronic surveys reported an average mean return rate of 39.6% (96). In addition, other studies have found that survey response rates among medical and public health professionals, are particularly variable, ranging from 20% to 75%, with a mean response rate of around 40% for electronic surveys (96–99). Thus, based on the literature, this response rate is considered in the acceptable return rate range. Also, the use of follow-up emails to reiterate the purpose and importance of the program evaluation may contributed

to this acceptable response rate (100). Many measures to ensure an increase in response rate were considered including sending multiple email reminders and having the SNS training team introduces the research project when they conducted training classes in states. Although the study response rate is considered the average mean return rate from the literature, there were many factors that might account for this return rate.

One of the possible factors repeatedly mentioned in the open and closed questions was that many respondents have many things to do in addition to their role as a state SNS coordinator or responders and they did not have available time to complete this survey. In addition, it is worthwhile to note that individuals who participated in the SNS training course were uniquely selected from their organization's management because of their main or additional role as a state's SNS representative or coordinator. As a result, only a few individuals have the opportunity to attend this training course.

Overall, responses were very positive regarding the respondent's overall satisfaction with the SNS training course. Respondents mostly agreed or strongly agreed with the in-class teaching style components such as in class lecture, group discussion, and hand-on activity. Respondents indicated that those components helped them better understand and remember the training objective learning materials. In addition, many respondents provided detailed positive comments about their general reaction to the training course. Most comments discussed how participants felt the hand-on/simulation/scenario activity during the training provided them the opportunity to practice what was just being taught in class and by doing so, allowed them the chance to remember the content more effectively.

Unlike most available training programs that mainly use lecture based skill training and lack the opportunity for practice (43), the SNS Preparedness training course uses a variety of teaching methods such as lecture based, PowerPoint presentation, discussion sharing, and hands-on activities with a scenario or simulation. Many past studies have proven that simulation based education and training have proven to be a practical and valid approach to prepare responders for response to disaster events (101; 102). In addition, literature has documented that interactive training methods have shown to be effective in increasing the quality of the training and improving the retention of knowledge through immediate reinforcement of learning (15; 103–105).

Furthermore, this level of positive open ended comments indicate that past SNS trainees felt very positive about the SNS training courses they have taken. In addition, results indicated that participants with less prior SNS knowledge and participants with more SNS knowledge gained both reacted positively to the training course. This association shows that participants with less prior SNS knowledge gained knowledge and retained it upon return to work. Additionally, because participants with less prior SNS knowledge and participants with more SNS knowledge both reacted positively to the training, this might show that the training course succeeded in delivering the stated learning objectives.

Responses were also very positive in regard to participants overall general reaction to the learning content from the SNS training course. Participants mostly agreed or strongly agreed with the relevance of topics discussed at the training and how they were useful to their response role. Participants also provided positive feedback about the

learning content obtained from the training course. The hands-on component was noted repeatedly as the tool most helpful in assisting them to recall course material. This result reiterates the effectiveness of utilizing hands-on methods as a way to enhance learning effectiveness.

Results showed that SNS objective knowledge test scores were not significantly associated with participant's prior SNS knowledge, knowledge gained, or knowledge remembered. In addition, results also indicated that SNS knowledge retention or remembered was also not significantly associated with the years during which participants took the training course. However, the mean of the number correctly answered SNS knowledge questions were considerably high (>16 out of 20). Many participants reported as sometimes or frequently using the knowledge and skills learned from the training to their response role.

Moreover many participants have applied knowledge and skills learned from the training to an emergency situation or event or to their response role and they thought that the knowledge and skills learned from the training courses allowed them to respond to the situation more effectively. In addition, the results found that those with less prior SNS knowledge, those that have gained more knowledge, and those that have remembered more knowledge, were more likely to make changes or implement something new in their response role or organization's response mission.

Studies have proven that if trainees are not exposed to critical events on a regular basic, their knowledge and skills in responding to such events will start to decline 6 – 12 months after the initial training (39). With the majority of participants who reported

applying something new to their response role or organization's response operation, the majority indicated that they applied it within 1 – 6 months. This lead to a possible conclusion that although there were no relationships between prior SNS knowledge, knowledge gained, and knowledge remembered; respondents continued to use their knowledge and have applied the knowledge and skills to their response role and/or in emergency situations, resulting in a high mean score for the SNS objective test. This result suggests that participants had learned a great deal of SNS knowledge and also continued to remember the knowledge and skills obtained during training.

In terms of employment status and ability to apply something new, the majority who have worked in their current employment position for less than 5 years reported that they have applied something new to their response role and/or their organization's response capabilities and the majority also indicated that it took them less than 6 months to implement any action. For those who have worked in emergency response for less than 5 years and more than 5 years, both groups indicated that the training was significant in changing the way they performed in their response role. These findings correlate to previous findings that years of work experience as well as profession are associated with the extent of action taken at the workplace (98; 106–108).

Limitation

There were a few potential limitations in this pilot study. The response rate of 38.9% may introduce social desirability bias and non-response bias. It could be argued that participants who felt more comfortable and had a more positive experience with the

training course were more likely to respond to the survey. Participants who did not have a positive experience with the training course may not have had the interest to respond to the survey or completely finish the survey, as a result, it could be possible that negative responses were not recorded.

Overall, 107 participants responded to the survey, however due to how the survey was designed, incorrect choices of the training course taken, and missing answers from survey questions, resulted with 93 surveys included in analysis. The pilot survey questionnaire was only intended to collect data for the SNS training course and its objectives were clearly presented in the solicitation email and on the first page of the survey. There were a total of 5 respondents that indicated MPC and 9 respondents MAD as their most recent training course taken. Regrettably, data from these 14 respondents were not included in the analysis and have resulted in a loss of valuable data. This was also due to how the survey was set up as participants were not required to answer every question in order to continue to the next question. This oversight was documented and changes was made in the full study survey so that future participants will be required to answer the most recent and year of training course taken in order to continue to the next question. In addition, due to the length of the survey, of the 93 surveys included in analysis, only 66 surveys were fully completed in all three parts of the survey questionnaire.

Conclusion

Findings from this study showed that most respondents express satisfaction about their experiences in the SNS training course and the course material was relevant to their response role and organization. Individuals who participated in the training course with less prior knowledge have potential to gain more knowledge through the training course. More importantly, the majority of respondents indicated that they have applied knowledge and skills learned from the course to their response role and/or their organization's response capabilities.

Chapter 4: A Retrospective Evaluation of the Centers for Disease Control and Prevention Strategic National Stockpile Training Program – Strategic National Stockpile Preparedness Training Course – Full Study

Evidence based training is a key component of preparedness planning and response activities designed to effectively prepare for, respond to and recover from public health emergencies and natural disasters. Understanding the impact of evidence-based training is a research priority that is critical for continuing high standards of preparedness training. The Strategic National Stockpile (SNS) Training Program is a type of preparedness and response training program that requires technical training and routine exercise of learned SNS knowledge and skills. The overall impact of this training program is unknown. This process and outcome evaluation research project is the first attempt to evaluate the effectiveness of this national preparedness and response training initiative.

The objective for this chapter is to discuss the evaluation of the Strategic National Stockpile Preparedness training course as one part of the SNS training program using a survey questionnaire that has been validated with internal consistency reliability and revised from an earlier study.

Strategic National Stockpile Preparedness Training Course

The Strategic National Stockpile Preparedness (SNS) training course is designed to educate and train local, state, and federal public health and emergency response personnel on how to effectively utilize and manage the strategic national stockpile resource in response to a manmade, natural, or technological disaster. The course

provides participants with specific knowledge on DSNS' levels of support, response concepts, planning and operational considerations for receiving, staging, and storing strategic national stockpile resources. In addition, the course also covers in-depth planning consideration for medical countermeasure dispensing campaigns including: regulator information about labeling regulations, operational considerations when investigational new drugs are used as part of an EUA, and point of dispensing site planning and operations. The SNS sponsored four, four-day long training courses each year at the Centers for Disease Control and Prevention headquartered in Atlanta, Georgia. The class size is limited to 35-40 participants. The DSNS requires that participants have experience in planning or management with a public health agency, an emergency management agency, or public safety agency; and, have some familiarity with the SNS stockpile to participate in the training course (60).

Methods

Study Sample

A retrospective cross-sectional design with one wave data collection was implemented. The study began with a population of 720 individuals who attended the Strategic National Stockpile Preparedness training courses given at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia between 2005 – 2011. Of the 770 individuals, a total of 250 individuals were randomly selected from a pool of 500 individuals that participated in the SNS course 2005 – 2010 using Excel function "=Rand()" (95); and 220 individuals attended the SNS training course in 2011 and were selected in total to add to our sample resulting in 470 potential respondents. To begin the

study, the DSNS training team lead sent a solicitation email with a direct link to the survey to 470 identified potential respondents. The first page of the survey contained information describing the objectives and format of the survey, assurance of confidentiality, and contact information of the PIs. A total of 102 emails returned due to invalid email addresses, resulted in a new total of 368 potential responders.

Respondents were invited to take a one-time three-part cross sectional survey questionnaire, an objective knowledge test of the SNS training course, and a demographic questionnaire. Participation was voluntary and participants were not required to answer every question on the survey. When participants opened the survey link, they were presented with a full explanation of the study, procedures for assuring confidentiality and information about informed consent. By beginning the survey, participants acknowledged that they had read the informed consent information and agreed to participate in the research study. Participants were not compensated to participate in this study.

To maximize response rate, three follow-up emails were sent: the first was sent two weeks after the initial solicitation email and the final was sent three weeks after the first follow-up email to 368 eligible participants requesting participation of those who had not yet responded to complete the survey. Completing the in person SNS training and having internet access were the only requirements for participation. The web-based survey was administered and managed by the University of Minnesota, Health Survey Research Center. The survey was managed through a secure website and data was stored on a secure University of Minnesota server. Data collection ended in August 2011.

Survey Questionnaire

A three-part survey was pilot tested, analysis of survey items provided insight into which items were redundant or non-informative. These items were eliminated from the survey prior to the full study. The survey questionnaire contained 31 questions regarding the SNS training received, 21 questions regarding the objective knowledge of the SNS, and 19 questions about demographic characteristics. The evaluation instrument was developed using a combination of methods such as the Kirkpatrick Model, literature review, and content expertise from the SNS training team.

Kirkpatrick's learning and training evaluation model was used as a framework to develop this survey instrument. The four levels included: level 1, reaction to the training; level 2, learning the intended knowledge, skills, attitudes, confidence, and commitment based on participation in the training events; level 3, behavior change when they are back on the job; and level 4, results of the training event and subsequent reinforcement.

The objective knowledge test included questions regarding the overall objectives of the SNS training course. These included: the DSNS' levels of support, response concepts, and planning and operational considerations for receiving, staging, and storing of SNS assets, for planning considerations in medical countermeasure dispensing campaigns with regulator information about labeling, investigational new drug operation, point of dispensing site selection, volunteer staffing, and public information and communications.

Demographic information such as primary employer, number of years in current response role, type and number of previous trainings attended, history of education, job

title, job category, level of primary work, where the participant would work during a response, years of experience, what is the participant's primary function in a response and geographic location was obtained.

Questions were multiple choice and open-ended questions for comments and suggestions. All survey questions measuring the reaction, learning, behavior, and result constructs were based on a Likert scale of 1 to 5 with answer choices such as: very unlikely to very likely; no new knowledge to a great deal of knowledge; not at all significant to all significant; and, not at all eager or to very eager. Participants were asked to select all of the response options in the question that were applicable. Each of the question included a "not applicable" choice as well. The three-part survey questionnaire required about 20 minutes to complete and was submitted anonymously. The survey and research methodology was submitted for review to the Institutional Review Board of the University of Minnesota and was granted an exemption.

An expert panel at the CDC DSNS evaluated the survey instrument for content validity. Multiple revisions were made based on the review and recommendations. A selected group of staff members from the CDC DSNS training group was invited to take the survey and provided feedback before the launch of the survey.

Statistical analysis

Respondents with missing values were excluded from analysis. Frequency tables were generated from data analysis for all multiple-choice questions. Descriptive statistics were calculated to summarize characteristics of study participants included proportions for categorical and discrete characteristics. Demographic information about the respondents was analyzed separately. Knowledge scores for each course were calculated as the sum of the number of correct course knowledge questions for each participant.

Analysis of variance (ANOVA) was used to identify associations between knowledge scores and categorical variables (e.g., self-rated prior knowledge, knowledge gained, and knowledge retained). Pearson's chi-square was used to identify associations between continuous variables (e.g., knowledge scores and learning construct scores). Chi-square tests were used to identify associations between categorical survey items. Multiple logistic regression was conducted to analyze the relationship between significant changes in response role performance and the amount of prior knowledge, knowledge gained, and time of employment in emergency response. Significance level alpha < 0.05 was used for all tests to identify significant associations. The denominator for percentages was calculated using the number of individuals who responded to specific questions (excluding missing answers).

Statistical analysis was performed using the statistical package SAS version 9.2. The University of Minnesota, Clinical and Translational Science Institute, Biostatistical Design and Analysis Center provided assistance with statistical analysis.

Results

Table 14: Characteristics of the most recent training course participants attended, year attended, and employment changes from 229 respondents in the SNS full study

		N	Percent
Most recent training course attended	Strategic National Stockpile	229	62.2%
Year completed most recent training course	2006	27	11.9%
	2007	13	5.7%
	2008	23	10.1%
	2009	35	15.4%
	2010	52	22.9%
	2011	77	33.9%
Since attended most recent training course:			
Still working in the same emergency response role	Yes	198	86.5%
	No	31	13.5%
Still working at the same organization	Yes	218	97.8%
	No	5	2.2%

Of the 368 successfully sent emails, 62.2% (n = 229) respondents indicated Strategic National Stockpile Preparedness training course as their most recent training course and 33.9% (n = 77) attended a training course in 2011. Since the time respondents participated in the most recent training course, 86.5% (n = 198) reported as still working in the same emergency response role and 97.8% (n = 218) reported as still working at the same organization.

Table 15: Demographic characteristics of respondents for the SNS training course in the full study

		N	Percent
Gender			
	Male	95	51.4%
	Female	90	48.6%
Age			
	18-29	20	10.7%
	30-39	43	23.0%
	40-49	55	29.4%
	50-59	46	24.6%
	> 60	23	12.3%
Race/ethnicity			
	White	158	85.9%
	Black or African American	13	7.1%
	Asian	2	1.1%
	Native Hawaiian or Pacific Islander	3	1.6%
	Alaskan Native or American Indian	2	1.1%
Education			
	High School	9	4.8%
	Associates	14	7.5%
	Bachelors	78	41.7%
	Masters	71	38.0%
	Doctoral	10	5.3%
	Other	5	2.7%

Of those who have responded, a total of 51.4% (n = 95) were male; 48.6% (n = 90) were female; 54.4% (n = 101) reported being 40-59 years of age; 85.9% (n = 158) were white, 41.7% (n = 78) held a bachelor's degree; and 38.0% (n = 71) held a master's degree.

Table 16: Employment characteristics of respondents for the SNS training course in the full study

		N	Percent
Level of Government currently working for	City	10	5.3%
	County	66	34.9%
	Tribal	--	--
	Regional	20	10.6%
	State	82	43.4%
	Federal	6	3.2%
	Not Government	5	2.6%
Type of Agency currently working for	Emergency Management	14	7.4%
	Public Health	160	84.7%
	Law Enforcement	5	2.6%
	Military	2	1.1%
	Hospital/Treatment Center	1	0.5%
	Other	7	3.7%
Length of time working at current agency	Less than 1 year	18	9.5%
	1 – 5 years	88	46.6%
	5 – 10 years	47	24.9%
	10 – 15 years	14	7.4%
	15 – 20 years	5	2.6%
	20+ years	17	9.0%
Length of time working in current position	Less than 1 year	28	14.8%
	1 – 5 years	120	63.5%
	5 – 10 years	29	15.3%
	10 – 15 years	4	2.1%
	15 – 20 years	3	1.6%
	20+ years	5	2.6%
Length of time working in emergency response	Less than 1 year	11	5.8%
	1 – 5 years	87	46.0%
	5 – 10 years	54	28.6%
	10 – 15 years	10	5.3%
	15 – 20 years	9	4.8%
	20+ years	18	9.5%
Area of work during an emergency response	Point of Dispensing	57	30.0%
	State or local E.O.C	120	63.2%
	Receipt, Store, & Distribute Facility	55	29.0%
	Treatment Center	5	2.6%
	Reservations/Tribal Lands	1	0.5%
	Other	32	16.8%
Primary function in an emergency response	Planner	48	25.4%
	Supervisor/Manager	49	25.9%
	Coordinator	54	28.6%
	Dispenser	4	2.1%
	Inventory Management	4	2.1%
	Volunteer	1	0.5%
	Other	29	15.3%

In regard to employment characteristics, 43.4% (n=82) worked at a state level of government; 84.7% (n = 160) in public health type of agency; 46.6% (n = 88) had worked at the current agency for 1 – 5 years; 63.5% (n = 120) had worked at their current position for 1 – 5 years; 46.0% (n = 87) had worked in emergency response for 1-5 years; 63.2% (n = 120) had worked at a state or local emergency operation center during an emergency response; and 28.6% (n = 54) served as a coordinator as their primary function in an emergency response.

Level 1: Reaction

Table 17: General reaction on participants' satisfaction from respondents of the SNS training course in the full study

		N	Percent
Training course met expectations			
	Strongly Disagree	7	3.1%
	Disagree	--	--
	Neither Agree or Disagree	3	1.3%
	Agree	76	33.9%
	Strongly Agree	138	61.6%
	Not Applicable	--	--
In-class lecture helped understand the materials being presented in the training			
	Strongly Disagree	7	3.1%
	Disagree	--	--
	Neither Agree or Disagree	1	0.4%
	Agree	86	38.6%
	Strongly Agree	129	57.8%
	Not Applicable	--	--
In-class group discussion helped understand the materials being presented in the training			
	Strongly Disagree	7	3.2%
	Disagree	--	--
	Neither Agree or Disagree	5	2.3%
	Agree	73	32.9%
	Strongly Agree	136	61.3%
	Not Applicable	1	0.5%
Hands-on components helped remember the skills learned from the training			
	Strongly Disagree	7	3.1%
	Disagree	1	0.4%
	Neither Agree or Disagree	6	2.7%
	Agree	44	19.6%
	Strongly Agree	161	71.9%
	Not Applicable	5	2.2%
Will attend another training course from CDC DSNS base on experience with this training course			
	Strongly Disagree	7	3.1%
	Disagree	3	1.3%
	Neither Agree or Disagree	9	4.0%
	Agree	40	17.9%
	Strongly Agree	162	72.3%
	Not Applicable	3	1.4%

Regarding general reaction and satisfaction from the most recent SNS training course taken: 61.6% (n = 138) strongly agreed that the training met their expectations;

57.8% (n = 129) strongly agreed that in-class lectures helped them understand the material being presented in class; 61.3% (n = 136) strongly agreed that the in-class group discussions helped them understand the materials being presented in class; 71.9% (n = 161) strongly agreed that hands-on components helped them remember the skills they learned from the training; and 72.3% (n = 162) strongly agreed that they would attend another training course from CDC DSNS based on their experience with this training course.

A total of 40.0% (n = 97) provided comments and suggestions regarding their general reaction and satisfaction of the training course via an open-ended question.

Some of the positive comments about the training course included: "I learned an incredible amount from the course. I would do it again and still pick up more information."; "Really appreciated the opportunity to network with folks from other states."; "Classroom followed up by hands-on is an excellent model. The material is reinforced more than just hearing the lecture."; "The course was great! Being able to meet our CDC partners and counterparts from other states was a fantastic opportunity. I keep in touch with many of them."; "Well laid out and the instructors tried to make it fun. They engaged the class in discussions about the subject allowing the sharing of ideas between different jurisdictions."; "This was by far the best course with the best information that I have attended in the preparedness field."; "Great course! Great instructors! Very valuable training especially for those who have not experienced an SNS exercise."; "Wonderful training! More beneficial than web based courses."; "I needed this course to give me the necessary background in SNS for my job and this training

accomplished that and more."; "My knowledge level increased substantially…the class and the contacts I made serve me everyday."; "The hands on portion in the warehouse was counter productive at best."; "The hands-on component of this training was highly important to my understanding of being able to receive SNS material on the POD level."; "Content is relevant to my job. Trainers were exceptional."; "Very good class, I still remember the hands on parts of the class. I feel if more of the Disaster classes where hands on and out of the chair the adult learners will retain the knowledge to save lives and manage better."; "I had been in some exercises before attending the course and the course helped me understand what my position in the exercise."; "Was surprised to find out how uninvolved some law enforcement agencies are working with their public health counterparts."; "I had a great experience and was able to network as well as learn from the others from around the country on what worked well and what didn't."; "The training course was enhanced by the skilled and experienced instructors."; "One of the most valuable parts of the course is interacting with colleagues from other states and territories to see how they are approaching things. I got lots of new ideas from other participants."; "The hands-on really helped to retain the information."; "I use the information I learned to help me guide decisions about SNS frequently."; "Very worthwhile…and helpful with planning on local training issues."; and last but not least, "One of the best I have attended in my 30 year public health employment."

Some of the comments for improvement included: "I would like to have spent more time with hands on warehouse training. This area is most difficult to set up during an exercise or event and most difficult to JITT."; "This course was excellent! The lecture

and hands-on components highly complemented each other, in using different learning methods to grasp the content. My only suggestion is to increase opportunity for round-table real-world application, especially with like communities."; "The only thing I would have changed was having the RealOpt software training earlier and utilize the software when we did the group POD exercise."; "I would have like for others from the health department to go as well, especially those assigned to SNS roles/LRS functions."; "Maybe fewer overall topics and more time to learn from each other."; "It is a great course but number days spent are too much, if it can be condensed in 3 will be better."; and last but not least, "Some of the presentations need to be updated and expand more on other threats besides Anthrax."

Level 2: Learning

Table 18: General reaction from respondents to the learning content from the SNS training course in the full study

		N	Percent
Topics discussed were relevant to response role			
	Strongly Disagree	6	2.7%
	Disagree	2	0.9%
	Neither Agree or Disagree	7	3.2%
	Agree	76	34.4%
	Strongly Agree	130	58.8%
	Not Applicable	--	--
Topics discussed were relevant to organization			
	Strongly Disagree	6	2.7%
	Disagree	--	--
	Neither Agree or Disagree	5	2.3%
	Agree	66	29.9%
	Strongly Agree	144	65.2%
	Not Applicable	--	--
Materials provided were useful resources for response role			
	Strongly Disagree	6	2.7%
	Disagree	2	0.9%
	Neither Agree or Disagree	11	5.0%
	Agree	66	29.9%
	Strongly Agree	136	61.5%
	Not Applicable	--	--
Performance in emergency response was improved by attending this training course	Strongly Disagree	6	2.7%
	Disagree	2	0.9%
	Neither Agree or Disagree	11	5.0%
	Agree	68	30.9%
	Strongly Agree	131	59.5%
	Not Applicable	2	0.9%

Regarding the general reaction to the learning content from the training course: 58.8% (n = 130) strongly agreed that topics discussed were relevant to their response role; 65.2% (n = 144) strongly agreed that topics discussed were relevant to their organization; 61.5% (n = 136) strongly agreed that the materials provided were useful resources for response role; and 59.5% (n = 131) responded to strongly agree that their performance in emergency responses was improved by attending this training course.

A total of 17.0% (n = 38) of respondents provided comments and suggestions regarding the general reaction of the content learned from the training course via an open-ended question. Overall, comments received about participants' general reaction to the content learned were positive and followed a similar thematic trend.

Some positive comments included: "All of the topics were timely and covered areas that were of interest to me and helpful in my role at work."; "I had always thought of setting up PODs with the receiving of SNS would be mainly vaccine but that was clarified at CDC that a lot of the SNS is antibiotics so the POD flow and throughput discussed made a lot more sense and other ideas I was struggling with fell into place."; "The course help me better understand the implications for those we support and enable me to perform my job more effectively."; "This course has greatly increased my occupational knowledge regarding country level application of SNS receipt & distribution and the science behind SNS. My background includes an MPH & Certificate in Biosecurity, but this course really filled in some practical blanks for me. It also greatly increased my understanding of state & federal coordination and concerns."; "I gained a wealth of knowledge which enhanced my ability to do my job."; "My counterparts and myself who were afforded the opportunity clearly excelled during our June full scale exercise. I appropriately shared much of the information in the student manual with my respective county health preparedness planners to further assist them with maintaining the most appropriate SNS plans possible."; "I continue to refer back to the course book as needed. The layout is easy to follow and not full of 'fluff' – it gives the information needed."; "Now implementing topics and other materials into emergency response

exercises in my state and university."; and last "The materials provided and the teamwork exercise helped in my performance and help me to understand my role versus the state and region coordinator."

Some comments for improvement included: "Materials needed to be better matched to the presentations – sometimes it was difficult to follow. However the materials and presentations were excellent tools independently."; "The omission of discussion on the TAR seems like a huge hole in the content as well as ICS. Those are the core pieces and were not discussed."; "Overall an excellent course. I would like to see a course geared toward Law Enforcement to assist with buy in from local 'SNS security' agencies."; "Being in a smaller, rural jurisdiction some of the information was challenging to scale down to our smaller situation."; and last "It would have been helpful to somehow understand my fellow students roles within their states. Our responsibilities seemed quite varied."

Table 19: Self-reported amount of prior SNS knowledge, knowledge gained, and knowledge remembered from respondents in the full study

		N	Percent
*Prior SNS knowledge			
	None/Very Little Knowledge	40	2.3%
	Some Knowledge	124	56.1%
	A Lot Knowledge	44	19.9%
	Great Deal Knowledge	13	5.9%
*New SNS knowledge gained			
	None/Very Little Knowledge	4	1.8%
	Some Knowledge	52	23.5%
	A Lot Knowledge	117	52.9%
	Great Deal Knowledge	48	21.7%
*SNS knowledge rememberedno		2	0.9%
	None/Very Little Knowledge		
	Some Knowledge	61	27.6%
	A Lot Knowledge	117	52.9%
	Great Deal Knowledge	41	18.6%

**Stand alone question, not a part of the Learning construct*

In regard to respondents self-reported prior SNS knowledge, knowledge gained, and knowledge remembered, a total of 56.1% (n = 124) reported having some prior SNS knowledge before attending the training course; 52.9% (n = 117) indicated that they have gained a lot of new knowledge during the training course; and 52.9% (n = 117) indicated that they still remembered a lot of knowledge from the training course.

Relationship between self-reported prior SNS knowledge, knowledge gained, knowledge remembered, and four Kirkpatrick's constructs

An ANOVA analysis was conducted to measure the association between the four Kirkpatrick's constructs and self-reported amount of SNS knowledge questions. Respondents with more SNS knowledge gained reported a more positive reaction to the training course (p-value <0.05). In addition, respondents with more SNS knowledge gained and SNS knowledge remembered reported in a more positive reaction to their

learning experience in the training course (p-value <0.05). Lastly, respondents with more SNS knowledge gained and respondents with more knowledge retained showed more behavior changes (p-value <0.05).

Table 20: Relationships between significant changes in response role due to the SNS training and selected covariates in the full study

	Odds ratios (95% confidence intervals)
A lot of prior knowledge	1.62 (0.52, 5.07)
A lot of knowledge gained	4.91 (1.72, 14.02)
More than 5 years of employments in ER	0.64 (0.25, 1.64)

Multiple logistic regression was conducted to analyze the relationship between significant changes in response role performance and the amount of self-reported prior SNS knowledge, knowledge gained, and time of employment in emergency response.

Results revealed that respondents having a lot of prior SNS knowledge increased the mean odds of changes in their response role performance by 61.8% when compared to respondents with not having a lot of prior SNS knowledge.

In addition, respondents having a lot of SNS knowledge gained increased the mean odds of changes in their responses role performance by 390.7% when compared to respondents not having a lot SNS knowledge gained (p-value <0.05).

Moreover, respondents with having more than 5 years of employment in emergency response decreased the mean odds of changes in their response role by 36.4% when compared to respondents not having more than 5 years of employment experience in ER.

Table 21: Total number of correctly answered SNS objective knowledge questions in the full study

Year	Mean	LowerCL	UpperCL	Min	Max	P-Value
2006	16.5	15.6	17.5	12	20	
2007	17.1	15.6	18.6	14	20	
2008	16.8	15.7	17.9	13	19	0.81
2009	17.1	16.2	17.9	6	20	
2010	16.9	16.2	17.6	10	20	
2011	16.4	15.9	17.0	12	20	

Overall, respondents who have participated in the SNS training course in 2007 and 2009 have the highest mean scores of correctly answered SNS knowledge questions. An ANOVA analysis was performed and found that SNS knowledge remembered was not significantly different (p-value = 0.81) across course years among respondents.

Association between SNS objective knowledge test scores, demographic characteristics, and the four constructs

ANOVA and correlations were conducted to measure association between SNS objective knowledge test scores, various demographics, and construct. Results have show that level 2 learning construct and SNS objective knowledge test scores are significantly associated (p-value = 0.02). Also, SNS objective knowledge test score is also significantly associated (p-value = 0.03) with frequencies of how much knowledge about the course material respondents think they still remember from the training course.

Level 3: Behavior

Table 22: The degree to which participants applied the SNS knowledge and skills learned from the training course to their job in the SNS full study

		N	Percent
Degree one think he/she applied knowledge and skills learned from training course to response role	None at all	2	0.9%
	Very little application of knowledge and skills	10	4.6%
	Some application of knowledge and skills	79	36.1%
	A lot of knowledge and skills applied	78	35.6%
	A great deal of knowledge and skills applied	50	22.8%
Frequency one used knowledge and skills learned from the training to response role	Never	8	3.6%
	Sometimes	96	43.6%
	Frequently	82	37.3%
	Always	34	15.5%
Significance of the training in changing the way he/she performed in response role today	Very significant	57	25.9%
	Somewhat significant	59	26.8%
	Significant	76	34.5%
	Not very significant	24	10.9%
	Not at all significant	4	1.8%
Significance of the new knowledge and skills gained to organization's response mission	Very significant	62	28.2%
	Somewhat significant	71	32.3%
	Significant	70	31.8%
	Not very significant	13	5.9%
	Not at all significant	4	1.8%
*Application of knowledge and skills learned from the training course to an emergency situation or event	Yes	105	47.7%
	No	115	52.3%
*Knowledge and skills gained from the training allowed one to respond to an emergency event more effectively	Yes	93	89.4%
	No	2	1.9%
	Maybe	9	8.7%

**Stand alone question, not a part of the Behavior construct*

Regarding application of knowledge and skills learned from the training course to response role, 36.1% (n = 79) reported that they have applied some knowledge and skills

learned from the training course to their response role; 43.6% (n = 96) reported as sometimes using the knowledge and skills learned from the training to response role; 34.5% (n=76) indicated that they thought the training course was significant in changing the way they performed in their response role; and 32.3% (n = 71) reported that the knowledge and skills gained were significant to organization's response mission.

Overall 47.7% (n = 105) applied the knowledge and skills learned from the training course to an emergency situation or event. A total of 45% (n = 100) provided comments on what type of emergency situation or events that they have applied knowledge and skills gained from the training course; 54% (n = 54) responded to the H1N1 pandemic response; other type of responses included the State of the Union; foodborne disease outbreaks; anthrax incident; fire and flood emergency; planning, conducting, and evaluating SNS exercises; tornado and flood response; situational training exercise; hurricane Katrina & Rita and a tornado in South Texas; and, offer training to other SNS partners.

Of those who have applied knowledge and skills learned from the training course to an emergency situation or event, about 90% (n = 93) reported that the knowledge and skills gained from the training course allowed them to respond to the event more effectively.

Level 4: Results

Table 23: Action taken by participants as a result of the attending the SNS training course in the full study

		N	Percent
Experience with this training course lead one to want to make changes to organization's response plans, SOPs, processes, etc.	Yes	148	67.3%
	No	34	15.5%
	Maybe	38	17.3%
*Applied something differently or applied something new to response role or organization's response capabilities	Yes	157	71.4%
	No	63	28.6%
*Length of time after the training course the action in the previous question was applied	Immediately	32	20.5%
	Within 1-3 months	58	37.2%
	Within 3-6 months	32	20.5%
	Within 6-12 months	21	13.5%
	More than 1 year	2	1.3%
	More than 2 years	7	4.5%
	Other	3	2%
Encountered any organizational challenges in the process to apply something new	Yes	67	42.9%
	No	89	57.1%
Encountered any organizational assistance in the process to apply something new	Yes	110	70.5%
	No	46	29.5%
*Action taken as a result from taking this training course (select all that apply)	Developed an all-hazards emergency response plan	150	--
	Updated an all-hazards emergency response plan	144	--
	Planned strategic sites for RSS	141	--
	Planned sites for possible POD	156	--
	Conducted an exercise for POD	143	--
	Conducted a real event for POD	97	--
	Other	19	--
Training course helped did a better job in action(s) indicated previously	Yes	173	91.5%
	No	4	2.1%
	Maybe	12	6.3%

**Stand alone question, not a part of the Behavior construct*

Regarding the application of knowledge and skills learned from the training course to one's response role, 67.3% (n = 148) reported that the experience with the SNS

training course lead them to want to make changes to their organization's response plans, SOPs, processes; 71.4% (n = 157) applied something differently or applied something new to their response role or organization's response capabilities; 37.2% (n = 58) applied the knowledge and skills within 1 – 3 months after the training course; 57.1% (n = 89) did not encounter any organizational challenges in the process; 70.5% (n = 110) encountered organizational assistance in the process.

As a result of taking the training course, n = 156 respondents planned sites for a possible POD; n = 150 respondents developed an all-hazards emergency response plan; n = 144 respondents updated an all-hazards emergency response plan; n = 143 respondents conducted an exercise for POD; n = 141 respondents updated an all-hazards emergency response plan; and n = 97 conducted a real event for POD.

A total of 16% (n = 37) of participants provided comments on actions that were taken as a result of taking the training course, some of those actions included: updated emergency public information plan; staged warehouse space; assisted in development of first responder and university closed PODs; updated regional SNS Plan; met with other organizations to gain communication with them; developed an SNS plan that included multiple jurisdictions; provided more valuable LTAR technical assistance and more valuable exercise planning input; wrote SOP for warehouse at RDS; identified another building for receiving, staging and storing SNS for primary POD location; conducted an exercise for the RSS; conducted national level exercise for RSS process and planning, developed an expansion curriculum to integrate all levels of staff; created at least 4 major community outreach projects that use the POD model to deliver services; incorporated

topics and material into college courses for healthcare workers; and proposed a plan for additional closed PODs. Of those that have applied something differently or applied something new to their response role or organization's response capabilities, about 92% (n = 173) reported that the training course helped them do a better job in the actions indicated above.

Relationship between current employment position, emergency response position, and action applied to response role and/or organization's response capabilities

Of the 78% (N=148) who were working in their current employment position for less than 5 years, more than 70% indicated that they applied something new to their response role and/or their organization's response capabilities.

Of the 52% (n = 98) respondents who were working in their emergency response position for less than 5 years, about 91% (n = 89) indicated that they applied something new to their response role and/or their organization's response capabilities. Of the 48% (n = 91) respondents who were in emergency response position for more than 5 years, about 84% (n = 76) indicated that the training was significant in changing the way they performed their response role. For all those respondents who applied something new to their response role and/or their organization's response capabilities, 78% applied the material within 6 months of taking the course.

Action currently doing in response role

A total of 63% (n = 145) provided comments on actions and/or activities that they were currently doing in their response role at the time of taking the survey that they did not do before attending the training course. Some of the actions included: trained new SNS coordinator; changed the way the RSS warehouse is structured; coordination between partners had became better at this time due to the training that representatives from both agencies have participated; participated in state-level RSS discussion; planned better and developed new POD; developed and conducted POD training for both face to face and online course; developed a SNS request procedure for public health district and hospitals; increased mass dispensing details; and last but not least, collaborated with community partners and focused on volunteer and agency staff training in both the LRS and POD settings.

Action currently not doing in response role

A total of 48% (n=111) provided comments on actions and/or activities that they were not currently doing in their response role at the time of taking the survey that they did do before attending the training course. Some of the actions included: transitioned from using public health staff to run local distribution site and have collaborated with internal facilities department to manage warehouse operations; implemented MOU's instead of verbal agreement to avoid confusion; and, disease specific training.

Most effective components about the training course

A total of 70% (n = 161) provided comments on what they found most effective about the training course. Some of the comments included: "Getting to see and handle the Push Package was extremely helpful. And getting to know my colleagues around the country was also a big benefit of this course."; "I liked how the course progress through federal, state and local response. It really helped bring the big picture into focus. The RSS exercise and RealOpt demo were very helpful."; "Meeting with counterparts from across the nation and sharing experiences."; "Discussion about strategies that other states use and the connections to peers/partners in other states and at the federal level."; "Hands-on exposure to the components."; "The modeling program."; "Understanding of medical specific distribution and dispensing."; and last but not least, "Actually seeing how federal, state and local response are very dependent on each other. It takes all entities to respond to a public health event which requires deploying the SNS."

Most ineffective component about the training course

About 58% (n = 132) provided comments on areas they found least effective about the training course. Some of the comments included: "Death by power points. It was hard to pay attention during some of the lectures because the slides did not match what was in our books. It would be nice to include some interactive exercises."; "Some of the presentations regarding the legal issues."; "Long busing/transport times to and from the site."; "There are no clear directions from the CDC about returning product and with expired product there is no easy way for local agencies to dispose of it. The course

stated that it would be returned the same way it came but there should be a plan for this in DSNS as there is no funding locally."; "Medical reserve corps presentation, Toursolver software, no time for learning what counterparts are doing."; "Just-in-time training lecture and exercise."; and last but not least, "It was a good training, but could have been done in 3 days. A lot of repetitive by presenters, needed more coordination of what was being delivered."

Suggestions of other topics or activities to be included

A total of 42% (n = 118) provided suggestions on topics or activities that should be included to make this training course more effective. Some of the suggestions were: "Effective methods for training others on SNS. Maybe introduction the TAR tool."; "A reminder about the uncertainty of the specificity of products. The use of different brand names. How will things work after the first 10 days of medication? What about situations other than anthrax--what will be sent in those cases?"; "Inclusion of more hands-on learning activities with opportunity for social networking/discussion and also the inclusion of more success stories from the people who have made it successful."; "More information on Closed PODs especially how states across the country are handling the liability aspect."; "Best practices from local jurisdictions."; "Actual POD set-up exercises, dispensing drills and commonly encountered issues during dispensing and how to deal with them effectively."; "More decision-making exercises regarding POD design, operations, and also policy modeling."; "More of a focus on the policy implications of various dispensing modalities."; "Tour of the CDC, overview of the areas of the CDC and

how the federal government is working to be more timely in grant management and funding issues related to the SNSN."; "Incorporate best practices from all levels of the SNS distribution and dispensing chain."; "Provide a refresher SNS course."; "Integration of special need partners."; "More about public private partnership."; "More information pertaining to CHEMPACK and SLEP."; "I think it would be great to have different levels; such as a beginning course (general and broad) and then expand to intermediate and beyond with more specific information."; "Add training on All-Hazard planning - hurricanes, chemical spills, radiation, etc."; and last "Need an advance course where we actually run the RSS and POD for a few days."

Discussion

The response rate for this study was 62.2%. This response rate is considered high compared to the 32.2% response rate in the pilot study. Previous studies have found that survey response rates among medical and public health professionals, are particularly variable, ranging from 20% to 75%, with a mean response rate of around 40% for electronic surveys (96–99). In addition, the multiple email reminders may also have contributed to this higher response rate (100). The shortened survey questionnaire may contribute to the higher response rate and survey completeness in the full study.

In general, response for the reaction, learning, behavior, and constructs are similar to those in the pilot study. Overall, responses were very positive regarding respondent's overall reaction of their satisfaction of the SNS training course. Respondents mostly agreed or strongly agreed with the in-class teaching style components such as in class lecture, group discussion, and hand-on activity. Respondents indicated that those

components helped them better understand and remember the training objective learning materials. In addition, many respondents provided detailed positive comments about their general reaction to the training course. Most comments discussed how participants felt the hands-on/simulation/scenario activity during the training provided them the opportunity to practice what was just being taught in class and by doing so, allowed them the chance to remember the content more effectively.

Unlike most available training programs that mainly use a lecture based format and lack skill training and opportunity for practice (43), the SNS Preparedness training course uses a variety of teaching methods such as lecture, PowerPoint presentation, discussion sharing, and hands-on activities with a scenario or simulation. Many past studies have proven that simulation based education and training are practical and valid approach to prepare responder to response to disaster events (101; 102). In addition, the literature has documented that interactive training methods have been shown to be effective in increasing the quality of the training and improving retention of knowledge through immediate reinforcement of learning (15; 103–105).

Furthermore, this level of positive open ended comments indicate that past SNS trainees felt very positively about the SNS training course they have taken. In addition, results indicated that participants with less prior SNS knowledge and participants with more SNS knowledge gained both reacted positively to the training course. This association shows that participants with less prior SNS knowledge gained knowledge and retained it upon return to work. Additionally, because participants with less prior SNS knowledge and participants with more SNS knowledge both reacted positively to the

training, this might show that the training course succeeded in delivery of the stated learning objectives.

Responses were also very positive in regard to participants' overall general reaction to the learning content from the SNS training course. Participants mostly agreed or strongly agreed with the relevance of topics discussed at the training and how they were useful to their response role. Participants also provided positive feedback about the learning content obtained from the training course. The hands-on component was noted repeatedly as the tool most helpful in assisting them to recall course material. This result reiterates the effectiveness of utilizing hands-on method as a way to enhance learning effectiveness that has been proven in many past studies.

Results showed that SNS objective knowledge test scores were not significantly associated with participant's prior SNS knowledge, knowledge gained, or knowledge remembered. In addition, results also indicated that SNS knowledge retention was also not significantly associated with the years participants took the training course. However, the mean of the number correctly answered SNS knowledge questions were considerably high (>16 out of 20). Many participants reported they had sometimes or frequently using the knowledge and skills learned from the training in application to their response role. Also, many participants have applied knowledge and skills learned from the training to an emergency situation or event or to their response role and they thought that the knowledge and skills learned from the training courses allowed them to respond to the situation more effectively. In addition, results found that those with less prior SNS knowledge, those that have gained more knowledge, and those that have remembered

more knowledge, were more likely to make changes or implement something new in their response role or organization's response mission.

Studies have proven that if trainees are not exposed to critical events on a regular basis, their knowledge and skills in responding to such events will start to decline 6 – 12 months after the initial training (39). With the majority of participants who reported applying something new to their response role or organizational response operation, the majority has indicated they applied it within 1 – 6 months. This leads to a possible conclusion that although there was no relationship between prior SNS knowledge, knowledge gained, and knowledge remembered; respondents continued to use their knowledge and have applied the knowledge and skills to their response role and/or in emergency situations, resulting in a high mean score for the SNS objective test. This phenomenon suggests that participants have learned a great deal of SNS knowledge and also continued to remember that knowledge and skills obtained during training.

In terms of employment status and ability to apply something new, the majority who have worked in their current employment position for less than 5 years reported that they have applied something new to their response role and/or their organization's response capabilities and the majority also indicated that it took them less than 6 months to implement the action. For those who have worked in emergency response for less than 5 years and more than 5 years, both groups indicated that the training was significant in changing the way they performed in their response role. These results agree with previous studies' findings that years of work experience as well as profession are associated with the extent of action taken at the workplace (98; 106–108).

Limitation

There were a few potential limitations in this full study of the SNS course. The response rate of 62.2%, may introduce social desirability bias and non-response bias. It could be argued that participants who felt more comfortable and had a more positive experience with the training course were more likely to respond to the survey. Participants who may not have a good experience with the training course may not have the interest to respond to the survey, as a result, it could be possible that negative responses were not recorded.

Having the survey online without an identification ID made it impossible to determine whether respondents had completed the survey more than once. However, it is very unlikely that anyone would have done so due to the lack of direct incentives and lengthiness of the survey. Also, it is possible that recall bias may have been presented. However, participants were asked to respond to the most recent training course they had taken; as a result, we are confident that recall bias was not presented to a large degree. Furthermore, the survey was relatively lengthy, and that access to computers and the Internet can be difficult within public health offices around the state.

In addition, data was collected based on a self-administered survey questionnaire completed by respondents. This process of data collection may underestimate the intervention effects if the respondents do not take the survey questionnaire seriously or overestimate the study if respondents provided the answer that they thought the trainers would want them to provide.

Conclusion

Findings from this study showed that most respondents express satisfaction about their experiences in the SNS training course and the course material was relevant to their response role and organization. Individuals who participated in the training course with less prior knowledge have potential to gain more knowledge through the training course. More importantly, the majority of respondents indicated that they have applied knowledge and skills learned from the course to their response role and/or their organization's response capabilities.

Chapter 5: A Retrospective Evaluation of the Centers for Disease Control and Prevention Strategic National Stockpile Training Program – Evaluation of the Mobile Preparedness Training Course – Full Study

Evidence based training is a key component of preparedness planning and response activities designed to effectively prepare for, respond to and recover from public health emergencies and natural disasters. Understanding the impact of evidence-based training is a research priority that is critical for continuing high standards of preparedness training. The Strategic National Stockpile (SNS) Training Program is a type of preparedness and response training program that requires technical training and routine exercise of learned SNS knowledge and skills. The overall impact of this training program is unknown. This process and outcome evaluation research project is the first attempt to evaluate the effectiveness of this national preparedness and response training initiative.

The objective for this chapter is to discuss the evaluation of the Mobile Preparedness Course as one part of the SNS training program using a survey questionnaire that has been validated with internal consistency reliability and revised from an earlier study.

Mobile Preparedness Training Course

The Mobile Preparedness Course (MPC) training course is designed to educate participants with information on the DSNS operational concepts, receiving, storing, staging and procedure requirements, and mass antibiotic dispensing. The course goals are to provide state, local and tribal officials with the knowledge, skills, and tools

necessary to receive, distribute, and dispense SNS assets. Participants will learn about: considerations and requirements for receiving, staging, storing, distributing, and dispensing of SNS stockpiles; essential elements of a point of dispensing and management structure; dispensing site setup, security considerations, volunteer recruiting, staffing, and management; and public information and communication. This training is a two-day course and is limited to 35 participants. Participants who attend this training course are those in planning or management positions in public health or emergency management, who are familiar with DSNS response methods, and should be a point of dispensing manager. This training course is being offered at the request of states on an average of eight times a year, and are hosted by the state while conducted by CDC trainers (61).

Methods

Study Sample

A retrospective cross-sectional design with one wave data collection was implemented. The study attempted to collect data from the population of 1831 individuals who attended the Mobile Preparedness training course hosted at the state level between 2005 – 2011. To begin the study, the DSNS training team lead sent a solicitation email with a direct link to the survey to 32 SNS state coordinators who may have hosted courses. SNS state coordinators were to: 1) forward the solicitation email to anyone from their state that had participated in this MPC training course; and, 2) forward a list of past

participants to CDC DSNS training program, or forward the list of past participants to the PIs.

Respondents were invited to take a one-time three-part cross sectional survey questionnaire, an objective knowledge test of the MPC training course, and a demographic questionnaire. The first page of the survey contained information describing the objectives and format of the surveys, assurance of confidentiality, and contact information of the PIs. Participation was voluntary and participants were not required to answer every question on the survey. When participants opened the survey link, they were presented with a full explanation of the study, procedures for assuring confidentiality and information about informed consent. By beginning the survey, participants acknowledged that they had read the informed consent information and agreed to participate in the research study. Participants were not compensated to participate in this study.

To maximize buy-in from the state SNS coordinators, three follow-up emails were sent: the first was sent two weeks after the initial solicitation email and the final was sent three weeks after the first follow-up email requesting SNS coordinators to help with solicitation of participants. Completing the in person SNS training and having internet access were the only requirements for participation. The web-based survey was administered and managed by the University of Minnesota, Health Survey Research Center. The survey was managed through a secure website and data was stored on a secure University of Minnesota server. Data collection ended in August 2011.

Survey Questionnaire

A three-part survey questionnaire was pilot tested in an earlier pilot study, analysis of survey items provided insight into which items were redundant or non-informative. These items were eliminated from the survey prior to the full study. The survey questionnaire contained 31 questions regarding the training received, 20 questions regarding the objective knowledge of the MPC and 23 questions about demographic characteristics. The evaluation instrument was developed using a combination of methods such as the Kirkpatrick Model, literature review, and content expertise from the SNS training team.

The Kirkpatrick's learning and training evaluation model was used as a framework to develop this survey instrument. The four levels included: level 1, reaction to the training; level 2, learning the intended knowledge, skills, attitudes, confidence, and commitment based on participation in the training events; level 3, behavior change when they are back on the job; and level 4, results of the training event and subsequent reinforcement.

The objective knowledge test included questions regarding the overall objectives of the MPC training course. These included: considerations and recruitments for receiving, staging, storing, distributing, and dispensing the SNS stockpile; consideration for conducting a mass antibiotic dispensing campaign; essential elements of a POD and POD management structure; dispensing site setup; security considerations; volunteer recruiting, staffing, and management; and public information and communications.

Demographic information such as primary employer, number of years in current response role, type and number of previous training attended, history of education, job title, job category, level of primary work, where would the participant work during a response, years of experience, the participant's primary function in a response and geographic location was obtained.

Questions were multiple choice and open-ended questions for comments and suggestions. All survey questions measuring the reaction, learning, behavior, and result constructs were based on a Likert scale of 1 to 5 with answer choices such as: very unlikely to very likely; no new knowledge to a great deal of knowledge; not at all significant to all significant; and, not at all eager or to very eager. Participants were asked to select all of the response options in the questions that were applicable. Each of the questions included a "not applicable" choice as well. The three part survey questionnaire required about 20 minutes to complete and was submitted anonymously. The survey and research methodology was submitted for review to the Institutional Review Board of the University of Minnesota and was granted an exemption.

An expert panel at the CDC DSNS evaluated the survey instrument for content validity. Multiple revisions were made based on the review and recommendations. A selected group of staff members from the CDC DSNS training group was invited to take the survey and provided feedback before the launch of the survey.

Statistical analysis

Respondents with missing values were excluded from analysis. Frequency tables were generated from data analysis for all multiple-choice questions. Descriptive statistics were calculated to summarize characteristics of study participants included proportions for categorical and discrete characteristics. Demographic information about the respondents was analyzed separately. The denominator for percentages was calculated using the number of individuals who responded to specific questions (excluding missing answers). Knowledge scores for each course were calculated as the sum of the number of correct course knowledge questions for each participant.

Analysis of variance (ANOVA) was used to identify associations between knowledge scores and categorical variables (e.g., self-rated prior knowledge, knowledge gained, and knowledge retained). Pearson's chi-square was used to identify associations between continuous variables (e.g., knowledge scores and learning construct scores). Chi-square tests were used to identify associations between categorical survey items. Multiple logistic regression was conducted to analyze the relationship between significant changes in response role performance and the amount of prior knowledge, knowledge gained, and time of employment in emergency response. Significance level alpha < 0.05 was used for all tests to identify significant associations. The denominator for percentages was calculated using the number of individuals who responded to specific questions (excluding missing answers).

Statistical analysis was performed using the statistical package SAS version 9.2. The University of Minnesota, Clinical and Translational Science Institute, Biostatistical Design and Analysis Center provided assistance with statistical analysis.

Results

Table 24: Characteristics of the most recent training course participants attended, year attended, and employment changes from 62 respondents in the MPC full study

		N	Percent
Most recent training course attended	Mobile Preparedness Course	62	3.0%
Year completed most recent training course	2006	18	29.0%
	2007	9	14.5%
	2008	5	8.1%
	2009	9	14.5%
	2010	14	22.6%
	2011	7	11.3%
Since attended most recent training course:			
Still working in the same emergency response role	Yes	51	83.6%
	No	10	16.4%
Still working at the same organization	Yes	61	98.0%
	No	--	--

Of the 1831 potential responders, 3.0% (n = 62) of potential respondents indicated the Mobile Preparedness training course as their most recent training course and 29.0% (n = 18) of respondents attended the training course in 2006. Since the time respondents participated in the most recent training course, 83.6% (n = 51) reported as still working in the same emergency response role and 98.0% (n = 61) reported as still working at the same organization.

Table 25: Demographic characteristics of the study population from respondents in the MPC full study

		N	Percent
Gender			
	Male	21	36.2%
	Female	37	63.8%
Age			
	18-29	3	5.2%
	30-39	10	17.2%
	40-49	15	25.9%
	50-59	24	41.4%
	> 60	6	10.3%
Race/ethnicity			
	White	55	94.8%
	Black or African American	1	1.7%
	Asian	--	--
	Native Hawaiian or Pacific Islander	--	--
	Alaskan Native or American Indian	1	1.7%
	Other	1	1.7%
Education			
	High School	5	8.6%
	Associates	7	12.1%
	Bachelors	23	39.7%
	Masters	16	27.6%
	Doctoral	4	6.9%
	Other	3	5.2%

Of those who have responded, a total of 36.2 % (n = 21) were male and 63.8% (n = 37) were female; 67.3% (n = 25) reported being 40-59 years of age; 94.8% (n = 55) were white, 39.7% (n = 23) held a bachelor's degree, and 27.6% (n = 16) held a master's degree.

Table 26: Demographic characteristics of participants employment type and length from respondents in the MPC full study

		N	Percent
Level of Government currently working for	City	--	--
	County	29	50.0%
	Tribal	4	6.9%
	Regional	23	39.7%
	State	1	1.7%
	Federal	1	1.7%
Type of Agency currently working for	Emergency Management	2	3.4%
	Public Health	53	91.4%
	Military	1	1.7%
	Hospital/Treatment Center	1	1.7%
	Other	1	1.7%
Length of time working at current agency	Less than 1 year	3	5.2%
	1 – 5 years	13	22.4%
	5 – 10 years	22	37.9%
	10 – 15 years	6	10.3%
	15 – 20 years	4	6.9%
	20+ years	10	17.2%
Length of time working in current position	Less than 1 year	6	10.3%
	1 – 5 years	21	36.2%
	5 – 10 years	23	39.7%
	10 – 15 years	5	8.6%
	15 – 20 years	2	3.4%
	20+ years	1	1.7%
Length of time working in emergency response	Less than 1 year	2	3.4%
	1 – 5 years	17	29.3%
	5 – 10 years	29	50.0%
	10 – 15 years	5	8.6%
	15 – 20 years	3	5.2%
	20+ years	2	3.4%
Area of work during an emergency response	Point of Dispensing	25	43.1%
	State or local E.O.C	27	46.6%
	Receipt, Store, & Distribute Facility	15	25.9%
	Treatment Center	2	3.4%
	Reservations/Tribal Lands	--	--
	Other	12	20.69%
Primary function in an emergency response	Planner	10	17.2%
	Supervisor/Manager	15	25.9%
	Coordinator	21	36.2%
	Dispenser	2	3.4%
	Inventory Management	1	1.7%
	Volunteer	1	1.7%

In regard to employment characteristics, 50% (n=29) worked at a state level of government; 91.4% (n = 53) in public health type of agency; 37.9% (n = 22) had worked at the current agency for 5 - 10 years; 39.7% (n = 23) had worked at their current position for 5 - 10 years; 50% (n = 29) had worked in emergency response for 5 - 10 years; 46.6% (n = 27) had worked at a state or local emergency operation center during an emergency response; and 36.2% (n = 21) served as a coordinator as their primary function in an emergency response.

Level 1: Reaction

Table 27: General reaction on participants' satisfaction from respondents in the MPC full study

		N	Percent
Training course met expectations			
	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	2	2.0%
	Agree	31	31.0%
	Strongly Agree	29	29.0%
	Not Applicable	--	--
In-class lecture helped understand the materials being presented in the training			
	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	1	1.6%
	Agree	34	54.8%
	Strongly Agree	27	43.5%
	Not Applicable	--	--
In-class group discussion helped understand the materials being presented in the training			
	Strongly Disagree	--	--
	Disagree	1	1.6%
	Neither Agree or Disagree	1	1.6%
	Agree	29	46.8%
	Strongly Agree	31	50.0%
	Not Applicable	--	--
Hands-on components helped remember the skills learned from the training	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	2	3.2%
	Agree	21	33.9%
	Strongly Agree	39	62.9%
	Not Applicable	--	--
Will attend another training course from CDC DSNS base on experience with this training course	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	6	9.8%
	Agree	19	31.1%
	Strongly Agree	34	55.7%
	Not Applicable	2	3.3%

Regarding the general reaction and satisfaction from the most recent MPC training course taken: 31.0% (n = 31) responded to agree that the training met their

expectations; 54.8% (n = 34) responded to agree that the in-class lectures helped them understand the material being presented in class; 50% (n = 31) responded to strongly agree that the in-class group discussions helped them understand the materials being presented in class; 62.9% (n = 39) responded to strongly agree that hands-on components helped them remember the skills they learned from the training; and 55.7% (n = 34) responded to strongly agree that they would attend another training course from CDC DSNS based on their experience with this training course.

A total of 37% (n = 23) provided comments and suggestions pertaining to their general reaction and satisfaction of the training course via an open-ended question.

Some of the positive comments included: “Good mix of lecture, audio visual and hands on.”; “Really enjoyed the "field" component of the training.”; “Details were relevant to my job, as well as to the responsibilities that our preparedness partners are involved in, including volunteer leads.”; “Very thorough course...was like a mini SNS Course that I attended in Atlanta in July 2008.”; “It was one of the best courses I ever attended.”; and last, “Good material presented with a good mix of students.”

Some of the comments for improvement included: “The activity and content regarding setting up a mass clinic/POD were not very helpful. They did not seem to have any experience in the area of dispensing or running a clinic. They were knowledgeable of how to get it there.”; “The training staff could be a little better about follow through on course alterations based on hosts feedback. i.e. - shorter a section that is less applicable to audience etc. based on organization within that jurisdiction.”; and last, “It was a good overview of the SNS program at the Federal level. There was also good information

about SNS at the State level. However, I would like to see more of the local perspective during the training (since I work at the local level). About the only local element of the training was the hands-on exercise of designing a POD. I understand it would be difficult to highlight the local role more because there are so many variables (e.g., not all states have the same State/Local public health structure; not all local jurisdictions are the same, etc.), but I feel that we could have seen and heard more lessons learned and best practices from local jurisdictions around the country. Perhaps the lessons learned/best practices could be categorized according to population or geography (e.g., rural vs. urban)."

Level 2: Learning

Table 28: General reaction of participants to the learning content from respondents in the MPC full study

		N	Percent
Topics discussed were relevant to response role			
	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	7	11.3%
	Agree	28	45.2%
	Strongly Agree	27	43.5%
	Not Applicable	--	--
Topics discussed were relevant to organization			
	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	1	1.6%
	Agree	24	38.7%
	Strongly Agree	37	59.7%
	Not Applicable	--	--
Materials provided were useful resources for response role			
	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	3	4.9%
	Agree	31	50.8%
	Strongly Agree	27	44.3%
	Not Applicable	--	--
Performance in emergency response was improved by attending this training course	Strongly Disagree	--	--
	Disagree	--	--
	Neither Agree or Disagree	10	16.1%
	Agree	26	41.9%
	Strongly Agree	26	41.9%
	Not Applicable	--	--

Regarding the general reaction to the learning content from the training course: 45.2% (n = 28) responded to agree that topics discussed were relevant to their response role; 59.7% (n = 37) responded to strongly agree that topics discussed were relevant to their organization; 50.8% (n = 31) responded to agree that material provided were useful resources for response role; and 41.9% (n = 26) responded to strongly agree and 41.9% (n

= 26) responded to agree that their performance in emergency responses was improved by attending this training course.

Table 29: Self-reported amount of prior MPC knowledge, knowledge gained, and knowledge remembered from respondents in the full study

		N	Percent
*Prior MPC knowledge			
	None/Very Little Knowledge	19	30.6%
	Some Knowledge	22	35.5%
	A Lot Knowledge	16	25.8%
	Great Deal Knowledge	5	8.1%
*New MPC knowledge gained			
	None/Very Little Knowledge	1	1.6%
	Some Knowledge	23	37.1%
	A Lot Knowledge	32	51.6%
	Great Deal Knowledge	6	9.7%
*MPC knowledge remembered			
	None/Very Little Knowledge	--	--
	Some Knowledge	31	50.0%
	A Lot Knowledge	24	38.7%
	Great Deal Knowledge	7	11.3%

**Stand alone question, not a part of the Learning construct*

In regard to respondents self-reported amount of prior MPC knowledge, knowledge gained, and knowledge remembered, a total of 35.5% (n = 22) reported as having some prior MPC knowledge before attending the training course; 51.6% (n = 32) indicated that they have gained a lot of new knowledge during the training course; and 50% (n = 31) indicated that they still remembered some knowledge from the training course.

Relationship between self-reported prior MPC knowledge, knowledge gained, knowledge remembered, and four Kirkpatrick's constructs

An ANOVA analysis was conducted to measure the association between the four Kirkpatrick's constructs and self-reported amount of MPC knowledge questions. Respondents with more MPC knowledge gained and knowledge retained reported a more positive reaction to the training course (p-value <0.05). In addition, respondents with more MPC knowledge gained and with more knowledge retained reported more positive behavior changes (p-value <0.05).

Table 30: Relationship between significant changes in participant's response role due to the MPC training and selected covariates from respondents in the full study

	Odds ratios (95% confidence intervals)
A lot of prior knowledge	0.56 (0.14, 2.15)
A lot of knowledge gained	3.28 (0.84, 12.78)
More than 5 years of employments in ER	0.98 (0.24, 3.95)

Multiple logistic regression was conducted to analyze the relationship between significant changes in response role performance and the amount of prior MPC knowledge, knowledge gained, and time of employment in emergency response.

Results disclosed that respondents having a lot of prior MPC knowledge decreased the mean odds of changes in their response role performance by 44.4% when compared to respondents not having a lot of prior MPC knowledge.

In addition, respondents having a lot of MPC knowledge gained increased the mean odds of changes in their response role performance by 228.5% when compared to respondents not having a lot of MPC knowledge gained.

Additionally, respondents with having more than 5 years of employment in emergency response decreased the mean odds of changes in their response role by 2.4%

when compared to respondents not having more than 5 years of employment experience in emergency response.

Table 30: Total number of correctly answered MPC knowledge questions from respondents in the full study

Year	Mean	LowerCL	UpperCL	Min	Max	P-Value
2006	14.7	13.7	15.7	11	17	
2007	16.0	14.7	17.3	14	18	
2008	15.2	13.5	16.9	12	19	0.663
2009	14.9	13.4	16.3	13	16	
2010	15.3	14.2	16.4	11	18	
2011	14.6	13.1	16.0	12	18	

Overall, respondents who participated in the MPC training course in 2007 had the highest mean scores of correctly answered MPC knowledge questions. An ANOVA analysis was performed and found that MPC knowledge remembered was not significantly different ($p>0.05$) across course years among respondents.

Level 3: Behavior

Table 31: The degree to which participants applied the knowledge and skills learned from the training course to their job in the MPC full study

		N	Percent
Degree one thinks he/she applied knowledge and skills learned from training course to response role	None at all	--	--
	Very little application of knowledge and skills	4	6.5%
	Some application of knowledge and skills	32	51.6%
	A lot of knowledge and skills applied	12	19.4%
	A great deal of knowledge and skills applied	14	22.6%
Frequency one used knowledge and skills learned from the training to response role	Never	4	6.5%
	Sometimes	39	62.9%
	Frequently	14	22.6%
	Always	5	8.1%
Significance of the training in changing the way he/she performed in response role today	Very significant	7	11.3%
	Somewhat significant	17	27.4%
	Significant	23	37.1%
	Not very significant	15	24.2%
	Not at all significant	--	--
Significance of the new knowledge and skills gained to organization's response mission	Very significant	13	21.0%
	Somewhat significant	14	22.6%
	Significant	26	41.9%
	Not very significant	9	14.5%
	Not at all significant	--	--
*Application of knowledge and skills learned from the training course to an emergency situation or event	Yes	27	43.5%
	No	35	56.5%
*Knowledge and skills gained from the training allowed one to respond to an emergency event more effectively	Yes	24	88.9%
	No	--	--
	Maybe	3	11.1

**Stand alone question, not a part of the Behavior construct*

Regarding the application of knowledge and skills learned from the training course to response role, 51.6% (n = 32) reported that they have applied some knowledge

and skills learned from the training course to their response role; 62.9% (n = 39) reported as sometimes using the knowledge and skills learned from the training to response role; 37.1% (n=23) indicated that they thought the training course was significant in changing the way they performed in their response role; and 41.9% (n = 26) reported that they thought that knowledge and skills gained was significant to the organization's response mission.

A total of 43.5% (n = 27) applied the knowledge and skills learned from the training course to an emergency situation or event. A total of 44% (n = 27) provided comments on what type of emergency situation or events that they have applied knowledge and skills gained from the training course; 70% (n = 19) responded to the H1N1 pandemic response. Other type of responses included: public health exercises incorporating SNS; conducted dispensing and warehouse exercises; annual flu clinics; and, statewide distribution exercises. Of those who have applied knowledge and skills learned from the training course to an emergency situation or event, about 88.9% (n = 24) reported that the knowledge and skills gained from the training course allowed them to respond to the event more effectively.

Level 4: Results

Table 32: Action taken by participants as a result of attending the MPC training course from respondents in the full study

		N	Percent
Experience with this training course lead one to want to make changes to organization's response plans, SOPs, processes, etc.	Yes	31	50.0%
	No	12	19.4%
	Maybe	19	30.6%
*Applied something differently or applied something new to response role or organization's response capabilities	Yes	34	54.8%
	No	28	45.2%
*Length of time after the training course the action in the previous question was applied	Immediately	5	14.7%
	Within 1-3 months	8	23.5%
	Within 3-6 months	10	29.4%
	Within 6-12 months	4	11.8%
	More than 1 year	4	11.8%
	More than 2 years	2	5.9%
	Other	1	2.9%
Encountered any organizational challenges in the process to apply something new	Yes	17	50.0%
	No	17	50.0%
Encountered any organizational assistance in the process to apply something new	Yes	27	81.8%
	No	6	18.2%
*Action taken as a result from taking this training course (Select all that apply)	Developed an all-hazards emergency response plan	50	--
	Updated an all-hazards emergency response plan	44	--
	Planned strategic sites for RSS	44	--
	Planned sites for possible POD	51	--
	Conducted an exercise for POD	49	--
	Conducted a real event for POD	35	--
	Other	5	--
Training course helped did a better job in action(s) indicated previously	Yes	46	85.2%
	No	1	1.9%
	Maybe	7	13.0%

Regarding the application of knowledge and skills learned from the training course to one's response role, 50% (n = 31) reported that the experience with the MPC training course them to want to make changes to their organization's response plans,

SOPs, processes; 54.8% (n = 34) applied something differently or applied something new to their response role or organization's response capabilities; 29.4% (n = 10) applied within 3 - 6 months after the training course; 50% (n = 17) did not encounter any organizational challenges in the process; and, 81.8% (n = 110) received organizational assistance in the process. As a result of taking the training course, n = 51 respondents planned sites for possible POD; n = 50 respondents developed an all-hazards emergency response plan; n = 49 respondents conducted an exercise for POD; n = 144 respondents updated an all-hazards emergency response plan; n = 44 respondents updated an all-hazards emergency response plan; and, n = 35 respondents conducted a real event for POD.

A total of 24% (n = 15) of participants provided comments on actions that were taken as a result of taking the training course, some of those actions included: scheduled an exercise; designed a number of exercises relating to SNS; updated a county all hazard emergency plan; conducted statewide distribution exercises that included POD exercises at the local level; implemented pandemic influenza vaccination clinics; and, planned strategic sites for regional distribution. Of those that have applied something differently or applied something new to their response role or organization's response capabilities, about 85% (n = 46) reported that the training course helped them do a better job in the actions indicated above.

Relationship between current employment position, emergency response position, and action applied to response role and/or organization's response capabilities

Of the 47% (N=27) who were in their current employment position for less than 5 years, more than 59% indicated that they applied something new to their response role and/or their organization's response capabilities.

Of the 33% (n = 19) respondents who were in their emergency response position for less than 5 years, about 79% (n =4) indicated that they applied something new to their response role and/or their organization's response capabilities. Of the 52% (n = 98) respondents who were in their emergency response position for more than 5 years, about 67% (n = 39) indicated that the training was significant in changing the way they performed their response role. For all those respondents who applied something new to their response role and/or their organization's response capabilities, nearby 78% applied the material within 6 months of taking the course.

Action currently doing in response role

A total of 66% (n = 41) provided comments on actions and/or activities that they were currently doing in their response role at the time of taking the survey that they did not do before attending the training course. Some of those actions and/or activities comprised: worked on MOA/MOU's with local organizations; planned for both the "push" and "pull" methods for dispensing; involved Human Service employees in a county plan; used POD type setting to dispense H1N1 vaccines; used an area command system versus incident command; conducted information sessions regarding public-private partnerships in public health emergency preparedness; made a plan more

operational and improved communication; developed a full scale exercise; developed a closed POD plan; kept up-to-date on SNS protocols, training, and deployment criteria; assisted other areas of the state health department in fairly routine responses to measles and hepatitis A; and, assisted with identifying alternate PODs, head of household forms, and exercise evaluation.

Action currently not doing in response role

A total of 48% (n = 30) provided comments on actions and/or activities that they were not currently doing in their response role at the time of taking the survey that they did do before attending the training course. Some of the actions included: agency is not collecting more information than needed to provide prophylaxis; and operations under ICS.

Most effective components about the training course

A total of 73% (n = 45) provided comments on things that they found most effective about the training course. Some of the comments included: "The hands on experiences and the ability to network with other response planners in the state."; "Good to see the actual containers for the SNS and to hear directly from CDC. Cleared up some misconceptions."; "Understanding the process that SNS entails from the Federal, State, Regional, and Local levels."; "Bringing in an actual shipment carrier. Also working on a flow plan for that particular building. It helped me when I was setting up dispensing sites

in 4 hours or less."; "Understanding nomenclature and red tape issues."; and, "Hearing from people who have implemented Closed PODs. Hands on exercises. Group exercises."

Least effective components about the training course

A total of 57% (n = 35) provided comments on areas they found least effective about the training course. Some of the comments included: "I would like to see a universal outline for the SNS plan so that when we assist in another jurisdiction, the plan layout is familiar. We are all reinventing this and it wastes time. Also the forms to be used for mass dispensing should be consistent from one state to another."; "Expected more detail and depth regarding SNS inventory."; "Setting up the clinic activity. The activity was too basic and did not emphasize the operational end of running a mass clinic, but rather Law enforcement, transportation, etc."; "Too short. Longer course would have provided more information and application."; and, "As a coordinator for brining the training to our State, I requested an evaluation report from DSNS based on the participant feedback forms. I never received this report. Thus, we as a State were not able to gauge participant perceptions of the course. We now have an evaluation that accompanies any trainings brought in from external providers."

Suggestions of other topics or activities to be included

About 48% (n = 30) provided suggestions on topics or activities that should be included to make this training course more effective. Some of the suggestions were: "More information on RealOpt if this is an expectation of local public health that receives CDC funding for emergency preparedness planning."; "Perhaps psychological first aid -- how to ensure that you and your colleagues are successfully managing strong emotions and fatigue that occur during a public health emergency."; "Which Fact Sheets on antibiotics we can distribute to the general public."; "Dealing with rural population."; "Streamlining the training to fit what that particular state is doing."; "Alternative care sites (cPODs)"; "General updates and information on ethical considerations and prioritization."; "Discuss more real life situations and barriers that an SNS Coordinator may be up against in doing their jobs. Speak to the differences of how SNS Coordinators do their jobs from one state to another."; "Specifics about roles and responsibilities of functional positions within RDS and PODS."; "More hands-on activities."; "Need a refresher course."; and, "The Chempack program was not mentioned at the mobile training I received. The Chempack program has issues that need to be addressed to make it a viable option for nerve agent or agricultural exposure."

Discussion

The response rate for this study was 3.0%. Several factors may have caused this very low response rate. Although the solicitation email was sent to 32 SNS state coordinators and there were a total of 1831 individuals who attended the MPC training courses between 2006 - 2011. It is very difficult to determine whether the 1831

individuals were informed about this evaluation research study due to the manner in which the solicitation method was carried out. Since the MPC training course was conducted at the state level, the DSNS training team did not maintain records of past participants. Therefore, we were required to first forward the solicitation email through the state SNS coordinators. There were few state SNS coordinators that responded to the DSNS training team lead and/or the PI to inform them whether they were going to forward the email about the evaluation research project to their state's past MPC participants. In addition, it could also be possible that the current state SNS coordinators may be new to their positions and may not have records of individuals who participated in the MPC courses in the past years.

Overall, responses were very positive regarding the respondent's overall reaction of their satisfaction of the MPC training course. Respondents mostly agreed or strongly agreed with the in-class teaching style components such as in class lecture, group discussion, and hand-on activity. Respondents indicated that those components helped them better understand and remember the training objective learning materials. In addition, many respondents provided positive open-ended comments about their general reaction to the training course. Most comments discussed how participants felt the hands-on activity during the training provided them the opportunity to practice what was just being taught in class and by doing so, allowed them the chance to remember the content more effectively.

Unlike most available training programs that mainly used lecture and lack skill training and opportunity for practice (43), the MPC Preparedness training course uses a

variety of teaching methods such as lecture, PowerPoint presentations, discussion sharing, and hands-on activities with a scenario or simulation. Many past studies have proven that simulation based education and training are practical and valid approach to prepare responders to respond to disaster events (101; 102). Furthermore, the literature has documented that interactive training methods have been shown to be effective in increasing the quality of the training and improving retention of knowledge through immediate reinforcement of learning (15; 103–105).

Furthermore, the level of positive open-ended comments indicates that past MPC trainees felt very positive about the MPC training course that they have taken. In addition, results indicated that participants with less prior MPC knowledge, and participants with more MPC knowledge gained positive reaction to the training course. This association shows that participants with less prior MPC knowledge gained knowledge and retained it upon return to work. Additionally, because participants with less prior MPC knowledge and participants with more MPC knowledge both reacted positively to the training, this occurrence could conclude that the training course succeeded in delivering the learning objectives.

Responses were also very positive in regards to participants overall general reaction to the learning content from the MPC training course. Participants mostly agreed or strongly agreed with the relevance of topics discussed at the training and how they were useful to their response role. Participants also provided positive feedback about the learning content obtained from the training course. The hands-on component was noted repeatedly as the most helpful tool in assisting them for recall of course

material. This result reiterates the effectiveness of utilizing hands-on methods as a way to enhance learning effectiveness that has been proven in many past studies.

Results showed that the MPC objective knowledge test scores were not significantly associated with the participant's prior MPC knowledge, knowledge gained, or knowledge remembered. In addition, results also indicated that MPC knowledge retention was also not significantly associated with the year participants took the training course. The mean of the number correctly answered MPC knowledge questions were >14 out of 20. Many participants reported as sometimes or frequently using the knowledge and skills learned from the training in their response role. Also, many participants have applied knowledge and skills learned from the training to an emergency situation, event or to their response role. They thought that the knowledge and skills learned from the training courses allowed them to respond to the situation more effectively.

Studies have proven that if trainees are not exposed to critical events on a regular basis, their knowledge and skills in responding to such events will start to decline 6 – 12 months after the initial training (39). With the majority of participants who reported applying something new to their response role or organization response operation, the majority has indicated they applied the knowledge within 1 – 6 months. This to a possible conclusion that although there was no relationship between prior MPC knowledge, knowledge gained, and knowledge remembered; respondents continued to use their knowledge and have applied the knowledge and skills to their response role and/or in emergency situations, resulting in a acceptable mean score for the MPC

objective test. This phenomenon suggests that participants have learned a great deal of knowledge and also continued to remember that knowledge and skills obtained during training.

In terms of employment status and ability to apply something new, the majority of respondents who have worked in their current employment position for less than five years reported that they have applied something new to their response role and/or their organization's response capabilities. The majority also indicated that it took them less than six months to implement those actions. For those who have worked in emergency response for less than five years and more than five years, both groups indicated that the training was significant in changing the way they performed in their response role. These results agree with previous studies' findings that years of work experience as well as profession are associated with the extent of action taken at the workplace (98; 106–108).

Limitation

There are a few potential limitations in this study. Length of the survey questionnaire may have contributed to the low response rate and missing data for the objective knowledge test. A very low response rate of 3.0% may have significantly contributed to social desirability bias and non-response bias. It could be argued that participants who felt more comfortable and had a more positive experience with the training course were more likely to respond to the survey. Participants who may not have a good experience with the training course may not have the interest to respond to the survey, as a result, it could be possible that negative responses were not recorded.

Having the survey online without an identification ID made it impossible to determine whether people had completed the survey more than once. However, it is very unlikely that anyone would have done so due to the lack of direct incentives and lengthiness of the survey. Also, it is possible that recall bias may have been presented. However, participants were asked to respond to the most recent training course they had participated; as a result, we are confident that recall bias was not presented to a large extent. Furthermore, the survey was relatively lengthy, and that access to computers and the Internet can be difficult within public health offices around the state.

In addition, data was collected based on a self-administered survey questionnaire completed by respondents. This process of data collection may underestimate the intervention effects if the respondents do not take the survey questionnaire seriously or overestimate the study if respondents provided the answer that they thought the trainers would want them to provide.

Conclusion

Findings from this study showed that most respondents express satisfaction about their experiences in the MPC training course and the course material was relevant to their response role and organization. Individuals who participated in the training course with less prior knowledge have potential to gain more knowledge through the training course. More importantly, the majority of respondents indicated that they have applied knowledge and skills learned from the course to their response role and/or their organization's response capabilities.

Chapter 6: A Retrospective Evaluation of the Centers for Disease Control and Prevention Strategic National Stockpile Training Program – Evaluation of the Mass Antibiotic Dispensing Training Course – Full Study

Evidence based training is a key component of preparedness planning and response activities designed to effectively prepare for, respond to and recover from public health emergencies and natural disasters. Understanding the impact of evidence-based training is a research priority that is critical for continuing high standards of preparedness training. The Strategic National Stockpile (SNS) Training Program is a type of preparedness and response training program that requires technical training and routine exercise of learned SNS knowledge and skills. The overall impact of this training program is unknown. This process and outcome evaluation research project is the first attempt to evaluate the effectiveness of this national preparedness and response training initiative.

The objective for this chapter is to discuss the evaluation of the Mass Antibiotic Course as one part of the SNS Training Program using a survey questionnaire that has been validated with internal consistency reliability and revised from an earlier study.

Mass Antibiotic Dispensing Training Course

The Mass Antibiotic Dispensing (MAD) training course is designed to provide point of dispensing managers, local and state planners, and POD staff members the knowledge, skills and tools to dispense SNS stockpile medical supplies during a public health emergency. The MAD training course is a collection of presentations, group activities, discussions, and supporting materials to train participants about staffing,

opening, and managing medical supplies dispensing sites during a public health emergency. This course also provides a forum for discussing and sharing of information to promote consistency and standardization in POD operations throughout a state. The MAD course is being offered at the requestor state approximately eight times a year and the class size limited to 45 participants. The course is hosted by the state and conducted by CDC trainers. The course is a two-day training course. Participants who participate in this course are POD managers, state and local planners, and POD staff members who will be involved in mass antibiotic dispensing (19).

Methods

Study Sample

A retrospective cross-sectional design with one wave data collection was implemented. The study attempted to collect data from the population of 2059 individuals who attended the Mass Antibiotic Dispensing training course hosted at the states level between 2005 – 2011. To begin the study, the DSNS training team lead sent a solicitation email with a direct link to the survey to 32 SNS state coordinators who may have hosted courses. SNS state coordinators were to: 1) forward the solicitation email to anyone from their state that had participated in this MAD training course; and 2) forward a list of past participants to the CDC DSNS training program, or 3) forward a list of past participants to the PIs.

Respondents were invited to take a one-time three-part cross sectional survey questionnaire, an objective knowledge test of the MAD training course, and a

demographic questionnaire. The first page of the survey contained information describing the objectives and format of the surveys, assurance of confidentiality, and contact information of the PIs. Participation was voluntary and participants were not required to answer every question on the survey. When participants opened the survey link, they were presented with a full explanation of the study, procedures for assuring confidentiality and information about informed consent. By beginning the survey, participants acknowledged that they had read the informed consent information and agreed to participate in the research study. Participants were not compensated to participate in this study.

To maximize buy-in from the state SNS coordinators, three follow-up emails were sent: the first was sent two weeks after the initial solicitation email and the final was sent three week after the first follow-up email requesting SNS coordinators to help with solicitation of participants. Completing the in person SNS training and having internet access were the only requirements for participation. The web-based survey was administered and managed by the University of Minnesota, Health Survey Research Center. The survey was managed through a secure website and data was stored on a secure University of Minnesota server. Data collection ended in August 2011.

Survey Questionnaire

A three-part survey questionnaire was pilot tested in an earlier pilot study, analysis of survey items provided insight into which items were redundant or non-informative. These items were eliminated from the survey prior to the full study. The

survey questionnaire contained 31 questions regarding the MAD training received, 21 questions regarding the objective knowledge of the MAD, and 19 questions about demographic characteristics. The evaluation instrument was developed using a combination of methods such as the Kirkpatrick Model, literature review, and content expertise from the SNS training team.

Kirkpatrick's learning and training evaluation model was used as a framework to develop this survey instrument. The four levels included: level 1, reaction to the training; level 2, learning the intended knowledge, skills, attitudes, confidence, and commitment based on participation in the training events; level 3, behavior change when they are back on the job; and level 4, results of the training event and subsequent reinforcement.

The objective knowledge test included questions regarding the overall objectives of the MAD training course. These included: managing medical countermeasures dispensing sites during a public health emergency and standardization in POD operations throughout a state.

Demographic information such as primary employer, number of years in current response role, type and number of previous trainings attended, history of education, job title, job category, level of primary work, where would the participant work during a response, years of experience, what is the participant's primary function in a response and geographic location was obtained.

Questions were multiple choice and open-ended questions for comments and suggestions. All survey questions measuring the reaction, learning, behavior, and result constructs were based on a Likert scale of 1 to 5 with answer choices such as: very

unlikely to very likely; no new knowledge to a great deal of knowledge; not at all significant to all significant; and, not at all eager or to very eager. Participants were asked to select all of the response options in the question that were applicable. Each of the question included a "not applicable" choice as well. The three parts survey questionnaire required about 20 minutes to complete and was submitted anonymously. The survey and research methodology was submitted for review to the Institutional Review Board of the University of Minnesota and was granted an exemption.

An expert panel at the CDC DSNS evaluated the survey instrument for content validity. Multiple revisions were made based on the review and recommendations. A selected group of staff members from the CDC DSNS training group was invited to take the survey and provided feedback before the launch of the survey.

Statistical analysis

Respondents with missing values were excluded from analysis. Frequency tables were generated from data analysis for all multiple-choice questions. Descriptive statistics were calculated to summarize characteristics of study participants included proportions for categorical and discrete characteristics. Demographic information about the respondents was analyzed separately. Knowledge scores for each course were calculated as the sum of the number of correct course knowledge questions for each participant.

Analysis of variance (ANOVA) was used to identify associations between knowledge scores and categorical variables (e.g., self-rated prior knowledge, knowledge retained, knowledge gained). Pearson's chi-square was used to identify associations

between continuous variables (e.g., knowledge scores and learning construct scores). Chi-square tests were used to identify associations between categorical survey items. Multiple logistic regression was conducted to analyze the relationship between significant changes in response role performance and the amount of prior knowledge, knowledge gained, and time of employment in emergency response. Significance level alpha < 0.05 was used for all tests to identify significant associations. The denominator for percentages was calculated using the number of individuals who responded to specific questions (excluding missing answers).

Statistical analysis was performed using the statistical package SAS version 9.2. The University of Minnesota, Clinical and Translational Science Institute, Biostatistical Design and Analysis Center provided assistance with statistical analysis.

Results

Table 33: Characteristics of the most recent training course participants attended, year attended, and employment changes from 51 respondents in the MAD full study

		N	Percent
Most recent training course attended	Mass Antibiotic Dispensing	51	2.8%
Year completed most recent training course	2006	5	9.8%
	2007	5	9.8%
	2008	9	17.6%
	2009	9	17.6%
	2010	17	33.3%
	2011	6	11.8%
Since attended most recent training course:			
Still working in the same emergency response role	Yes	45	88.2%
	No	6	11.8%
Still working at the same organization	Yes	50	98.0%
	No	1	2.0%

Of the 2059 potential responders, 2.8% (n = 51) of potential respondents indicated Mass Antibiotic Dispensing training course as their most recent training course and 33.3% (n = 17) of respondents attended the training course in 2010. Since the time respondents participated in the most recent training course, 88.2% (n = 45) reported as still working in the same emergency response role and 98.0% (n = 50) reported as still working at the same organization.

Table 34: Demographic characteristics of the study population from respondents in the MAD full study

		N	Percent
Gender			
	Male	16	38.1%
	Female	26	61.9%
Age			
	18-29	3	7.1%
	30-39	6	14.3%
	40-49	15	35.7%
	50-59	14	33.3%
	> 60	4	9.5%
Race/ethnicity			
	White	35	85.4%
	Black or African American	3	7.3%
	Asian	1	2.4%
	Native Hawaiian or Pacific Islander	--	--
	Alaskan Native or American Indian	--	--
	Other	2	2.4%
Education			
	High School	2	4.8%
	Associates	5	11.9%
	Bachelors	18	42.9%
	Masters	10	23.8%
	Doctoral	3	7.1%
	Other	4	9.5%

A total of 38.1% (n = 16) were male; 61.9% (n = 26) were female; 69.0% (n = 29) reported being 40-59 years of age; 85.4% (n = 35) were white, 42.9% (n = 18) held a bachelors, and 23.8% (n = 10) held a master's degree.

Table 35: Employment characteristics of respondents in the MAD full study

		N	Percent
Level of Government currently working for	City	3	7.0%
	County	19	44.2%
	Tribal	5	11.6%
	Regional	15	34.9%
	State	--	--
	Federal	1	2.3%
	Not Government	3	7.0%
Type of Agency currently working for	Emergency Management	6	14.0%
	Public Health	37	86.0%
	Law Enforcement	--	--
Length of time working at current agency	Less than 1 year	4	9.3%
	1 – 5 years	7	16.3%
	5 – 10 years	11	25.6%
	10 – 15 years	3	7.0%
	15 – 20 years	9	20.9%
	20+ years	9	20.9%
Length of time working in current position	Less than 1 year	5	11.6%
	1 – 5 years	12	27.9%
	5 – 10 years	14	32.6%
	10 – 15 years	6	14.0%
	15 – 20 years	3	7.0%
	20+ years	3	7.0%
Length of time working in emergency response	Less than 1 year	3	7.1%
	1 – 5 years	13	31.0%
	5 – 10 years	14	33.3%
	10 – 15 years	3	7.1%
	15 – 20 years	3	7.1%
	20+ years	6	14.3%
Area of work during an emergency response	Point of Dispensing	20	46.1%
	State or local E.O.C	18	41.9%
	Receipt, Store, & Distribute Facility	12	27.9%
	Treatment Center	4	9.3%
	Reservations/Tribal Lands	1	2.3%
	Other	7	16.3%
Primary function in an emergency response	Planner	7	16.7%
	Supervisor/Manager	11	26.2%
	Coordinator	14	33.3%
	Dispenser	2	4.8%
	Other	3	7.0%

In regard to employment characteristics, 44.2% (n=19) worked at a county level of government; 34.9% (n = 15) worked at regional level of government; 86.0% (n = 37) worked in public health type of agency; 25.6% (n = 11) had worked at the current agency for 5 - 10 years; 32.6% (n = 14) had worked at their current position for 5 - 10 years; 33.3% (n = 14) had worked in emergency response for 5 - 10 years; 46.5% (n = 20) had worked in Point of Dispensing during an emergency response; and 33.3% (n = 14) served as a coordinator as their primary function in an emergency response.

Level 1: Reaction

Table 36: General reaction on participants' satisfaction from respondents in the MAD full study

		N	Percent
Training course met expectations			
	Strongly Disagree	3	5.9%
	Disagree	--	--
	Neither Agree or Disagree	2	3.9%
	Agree	21	41.2%
	Strongly Agree	25	49.0%
	Not Applicable	--	--
In-class lecture helped understand the materials being presented in the training			
	Strongly Disagree	3	5.9%
	Disagree	1	2.0%
	Neither Agree or Disagree	1	2.0%
	Agree	19	37.3%
	Strongly Agree	26	51.0%
	Not Applicable	1	2.0%
In-class group discussion helped understand the materials being presented in the training			
	Strongly Disagree	3	5.9%
	Disagree	1	2.0%
	Neither Agree or Disagree	1	2.0%
	Agree	20	39.2%
	Strongly Agree	25	49.0%
	Not Applicable	1	2.0%
Hands-on components helped remember the skills learned from the training	Strongly Disagree	3	6.0%
	Disagree	1	2.0%
	Neither Agree or Disagree	3	6.0%
	Agree	16	32.0%
	Strongly Agree	25	50.0%
	Not Applicable	2	4.0%
*Will recommend this training course to colleagues	Strongly Disagree	3	5.9%
	Disagree	--	--
	Neither Agree or Disagree	5	9.8%
	Agree	14	27.5%
	Strongly Agree	29	56.9%
	Not Applicable	--	--

Regarding general reaction and satisfaction from the MAD training course: 49.0% (n = 25) of respondents strongly agreed that the training met their expectations; 51.0% (n

= 26) strongly agreed that the in-class lectures helped them understand the material being presented in class; 49.0% (n = 25) strongly agreed that the in-class group discussions helped them understand the materials being presented in class; 50.0% (n = 25) strongly agreed that hands-on components helped them remember the skills they learned from the training; and 56.9% (n = 29) strongly agreed that they would attend another training course from CDC DSNS based on their experience with this training course.

A total of 27.0% (n = 14) respondents provided comments in regard to their general reaction and satisfaction about the training course via an open and ended question.

Some of the positive comments included: “It was helpful, kind of a confusing topic but it did help me to better understand all the processes.”; “I applied what I learned to my job in response planning, and I recommended the course to others.”; “Not only was the course invaluable (all components) the network of colleagues was also invaluable.”; and, “The course was very helpful for future planning/implementation.”

Level 2: Learning

Table 37: General reaction of participants to the learning content from respondents in the MAD full study

		N	Percent
Topics discussed were relevant to response role			
	Strongly Disagree	3	5.9%
	Disagree	--	--
	Neither Agree or Disagree	3	5.9%
	Agree	17	33.3%
	Strongly Agree	28	54.9%
	Not Applicable	--	--
Topics discussed were relevant to organization			
	Strongly Disagree	3	5.9%
	Disagree	--	--
	Neither Agree or Disagree	1	2.0%
	Agree	19	37.3%
	Strongly Agree	28	54.9%
	Not Applicable	--	--
Materials provided were useful resources for response role			
	Strongly Disagree	3	6.0%
	Disagree	--	--
	Neither Agree or Disagree	4	8.0%
	Agree	18	36.0%
	Strongly Agree	25	50.0%
	Not Applicable	--	--
Performance in emergency response was improved by attending this training course	Strongly Disagree	2	4.0%
	Disagree	1	2.0%
	Neither Agree or Disagree	7	14.0%
	Agree	15	30.0%
	Strongly Agree	24	48.0%
	Not Applicable	1	2.0%

Regarding the learning content from the most recent MAD training course taken: 54.9% (n = 28) of respondents strongly agreed that topics discussed were relevant to their response role; 54.9% (n = 28) strongly agreed that topics discussed were relevant to their organization; 50% (n = 25) strongly agreed that material provided were useful resources for response role; and 48.0% (n = 24) strongly agreed that their performance in emergency responses was improved by attending this training course.

Table 38: Self-reported prior MAD knowledge, knowledge gained, and knowledge retained from respondents in the full study

		N	Percent
*Prior MAD Knowledge			
	None/Very Little Knowledge	9	17.6%
	Some Knowledge	23	45.1%
	A Lot Knowledge	10	19.6%
	Great Deal Knowledge	9	17.6%
*New MAD knowledge gained			
	None/Very Little Knowledge	3	5.9%
	Some Knowledge	18	35.3%
	A Lot Knowledge	26	51.0%
	Great Deal Knowledge	4	7.8%
*MAD knowledge remembered			
	None/Very Little Knowledge	1	2.0%
	Some Knowledge	16	31.4%
	A Lot Knowledge	25	49.0%
	Great Deal Knowledge	9	17.6%

**Stand alone question, not a part of the Learning construct*

In regard to respondents self-reported amount of prior MAD knowledge, knowledge gained, and knowledge remembered, a total of 45.1% (n = 23) reported having some prior MAD knowledge before attending the training course; 51.0% (n = 26) indicated that they have gained a lot of new knowledge during the training course; and 49.0% (n = 25) indicated that they still remembered a lot of knowledge from the training course.

Relationship between self-reported prior MAD knowledge, knowledge gained, knowledge remembered, and four Kirkpatrick's constructs

An ANOVA analysis was conducted to measure the association between the four Kirkpatrick's constructs and self-reported amount of MAD knowledge questions. Respondents with more prior MAD knowledge and respondents with more knowledge gained reported in a more positive reaction to their learning experience from the training

course (p-value <0.05). In addition, respondents with more MAD knowledge gained and respondents with more knowledge retained reported more behavior changes (p-value <0.05). Lastly, respondents with less prior MAD knowledge reported in more positive results (p<0.05).

Table 39: Relationship between significant changes in participants' response role due to the MAD training and selected covariates from respondents in the full study

	Odds ratios (95% confidence intervals)
A lot of prior knowledge	0.56 (0.08, 4.25)
A lot of knowledge gained	21.31 (2.13, 213.06)
More than 5 years of employments in ER	0.11 (0.01, 1.04)

Multiple logistic regression was conducted to analyze the relationship between significant changes in response role performance and the amount of prior MAD knowledge, knowledge gained, and time of employment in emergency response.

Results disclosed that respondents having a lot of prior MAD knowledge decreased the mean odds of changes in their response role performance by 44.0% when compared to respondents not having a lot of prior MAD knowledge.

In addition, respondents having a lot of MAD knowledge gained increased the mean odds of changes in their responses role performance by 2,030% when compared to respondents not having a lot MAD knowledge gained. Also, having a lot of MAD knowledge gained is statistically significant to none, some, or a great deal of MAD knowledge gained for the MAD training course.

Additionally, respondents having more than 5 years of employment in emergency response decreased the mean odds of changes in their response role by 89% when

compared respondents with not having more than 5 years of employment experience in emergency response.

Table 40: Total number of correctly answered MAD knowledge questions from respondents in the full study

Year	Mean	LowerCL	UpperCL	Min	Max	P-Value
2006	16.6	14.8	18.4	13	18	
2007	17.4	15.6	19.2	14	19	
2008	17.2	15.5	18.8	16	19	>0.05
2009	15.8	14.2	17.5	12	19	
2010	17.1	16.0	18.1	13	20	
2011	16.8	15.2	18.5	15	20	

**Stand alone question, not a part of the Learning construct*

Overall, respondents who have participated in the MAD training course in 2007 had the highest mean score of correctly answered SNS knowledge questions. An ANOVA analysis was performed and found that SNS knowledge remembered was not significantly different across course years among respondents.

Level 3: Behavior

Table 41: The degree to which participants applied the knowledge and skills learned from the training course to their job from respondents in the MAD full study

		N	Percent
Degree one thinks he/she applied knowledge and skills learned from training course to response role	None at all	2	3.9%
	Very little application of knowledge and skills	1	2.0%
	Some application of knowledge and skills	18	35.3%
	A lot of knowledge and skills applied	22	43.1%
	A great deal of knowledge and skills applied	8	15.7%
Frequency one used knowledge and skills learned from the training to response role	Never	3	5.9%
	Sometimes	18	35.3%
	Frequently	26	51.0%
	Always	4	7.8%
Significance of the training in changing the way he/she performed in response role today	Very significant	10	19.6%
	Somewhat significant	19	37.3%
	Significant	10	19.6%
	Not very significant	11	21.6%
	Not at all significant	1	2.0%
Significance the new knowledge and skills gained to organization's response mission	Very significant	10	19.6%
	Somewhat significant	17	33.3%
	Significant	17	33.3%
	Not very significant	5	9.8%
	Not at all significant	2	3.9%
*Application of knowledge and skills learned from the training course to an emergency situation or event	Yes	31	60.8%
	No	20	39.2%
*Knowledge and skills gained from the training allowed one to respond to an emergency event more effectively	Yes	26	83.9%
	No	3	9.7%
	Maybe	2	6.5%

**Stand alone question, not a part of the Behavior construct*

Regarding the application of knowledge and skills learned from the training course to response role, 43.1% (n = 22) reported that they have applied a lot of

knowledge and skills learned from the training course to their response role; 51.0% (n = 26) reported as frequently using the knowledge and skills learned from the training to their response role; 33.3% (n= 17) indicated that they thought the training course was significant in changing the way they performed in their response role; and 33.0% (n = 17) reported that they thought that knowledge and skills gained was significant to the organization's response mission.

A total of 60.8% (n = 31) applied knowledge and skills learned from the training course to an emergency situation or event. A total of 59.0% (n = 30) provided comments on what type of emergency situation or events that they have applied knowledge and skills gained from the training course; 50.0% (n = 15) reported to responding to the H1N1 pandemic. Other type of emergency situation or event included: mass exercises; stateside SNS exercise; Measles POD, Hepatitis POD; mass inoculation program in schools; river flood; moving supplies around during flooding; earthquake and tsunami; Hurricane Katrina; Hurricane Gustav; and, 2010 ice storm.

Of those who have applied knowledge and skills learned from the training course to an emergency situation or event, 83.9% (n = 26) reported that the knowledge and skills gained from the training course allowed them to respond to the event more effectively.

Level 4: Results

Table 42: Action taken by participants as a result of attending the MAD training course from respondents in the full study

		N	Percent
Experience with this training course lead one to want to make changes to organization's response plans, SOPs, processes, etc.	Yes	33	64.7%
	No	8	15.7%
	Maybe	10	19.6%
*Applied something differently or applied something new to response role or organization's response capabilities	Yes	39	76.5%
	No	12	23.5%
*Length of time after the training course the action in the previous question was applied	Immediately	7	17.9%
	Within 1-3 months	12	30.8%
	Within 3-6 months	8	20.5%
	Within 6-12 months	6	15.4%
	More than 1 year	3	7.7%
	More than 2 years	3	7.7%
Encountered any organizational challenges in the process to apply something new	Yes	22	56.4%
	No	17	43.6%
Encountered any organizational assistance in the process to apply something new	Yes	29	74.4%
	No	10	25.6%
*Action taken as a result from taking this training course (select all that apply)	Developed an all-hazards emergency response plan	29	--
	Updated an all-hazards emergency response plan	34	--
	Planned strategic sites for RSS	34	--
	Planned sites for possible POD	39	--
	Conducted an exercise for POD	38	--
	Conducted a real event for POD	25	--
	Other	4	--
Training course helped did a better job in action(s) indicated previously	Yes	41	85.4%
	No	2	4.2%
	Maybe	5	10.4%

**Stand alone question, not a part of the Results construct*

Regarding the application of knowledge and skills learned from the training course to one's response role, 64.7% (n = 33) reported that the experience with the MAD training course lead them to want to make changes to their organization's response plans, SOPs, processes; 76.5% (n = 39) applied something differently or applied something new

to their response role or organization's response capabilities; 30.8% (n = 12) applied within 1 - 3 months after the training course; 56.4% (n = 22) did not encountered any organizational challenges in the process; and, 74.4% (n = 29) received organizational assistance in the process.

As a result of taking the training course, n = 39 respondents planned sites for possible POD; n = 38 respondents conducted an exercise for POD; n = 34 respondents updated an all-hazards emergency response plan; n = 34 respondents planned strategic sites for RSS; n = 29 respondents developed an all-hazards emergency response plan; n = 25 respondents conducted a real event for POD. Of those that have applied something differently or applied something new to their response role or organization's response capabilities, 85.4% (n = 41) reported that the training course helped them did a better job in the actions indicated above.

A total of 13.5% (n = 7) of participants provided comments on actions that were taken as a result of taking the training course, some of those action included: participated in planned SNS exercise; created just-in-time training PowerPoint presentation; developed a demobilization annex to the state's SNS Plan, provided better technical assistance to local jurisdictions, and helped locals to re-evaluate the use of closed PODs to enhance dispensing capabilities; developed a mass vaccination plan for my jurisdiction and updated our SNS base plan; and, developed a classroom training course for a public health department; conducted a drive through H1N1 vaccination POD at a fire department.

Relationship between current employment position, emergency response position, and action applied to response role and/or organization's response capabilities

Of the 40% (N = 17) who were in their current employment position for less than five years, more than 88% (n = 15) indicated that they applied something new to their response role and/or their organization's response capabilities.

Of the 38% (n = 16) respondents who were in their emergency response position for less than five years, about 88% (n = 15) indicated that they applied something new to their response role and/or their organization's response capabilities. Of the 62% (n = 26) respondents who were in emergency response position for more than five years, about 63% (n = 16) indicated that the training was significant in changing the way they performed their response role. For all those respondents who applied something new to their response role and/or their organization's response capabilities, nearby 69% applied the material within 6 months of taking the course.

Action currently doing in response role

A total of 56% (n = 29) of respondents provided comments on actions and/or activities that they were currently doing in their response role that they did not do before attending the training course. Some of those actions and/or activities comprised: participated in the SNS LTAR; trained instructors to conduct the course ourselves at the State level; rewrote the SNS plan to follow the LTAR; helped locals to rework their throughput numbers to account for closed PODs and best utilize limited staff and resources; attempted volunteer recruitment and supplemented personnel to staff POD;

developed all SNS guidance that goes out to local health departments; used ideas gained from discussion and lecture to enhance preparedness plans; worked with partners that were outside of usual public health partners; and revised POD plans.

Most effective components about the training course

A total of 61% (n = 31) provided comments on what they found most effective about the training course. Some of the comments entailed: “Presenter/trainers with actual experience in emergency response.”; “Interacting with local level planners to gain insight into their challenges and questions.”; “Talking with the locals and brainstorming new strategies for POD operations.”; “The cross-section of disciplines represented and variety of perspectives among the students during discussions.”; “Sharing and hearing what others are doing. i.e. best practices or what works and what doesn't.”; “Hands on POD training and seeing the size of the containers and how to utilize them.”; and, “Gaining insights from others and tips for improvement to our POD FOG and response plans.”

Most ineffective component about the training course

About 61%% (n = 20) provided comments on areas they found least effective about the training course. Some of the comments included: “Very detailed, tricky information in a short amount of time.”; “The assumption that trained people will be around to operate the PODs.”; “Receiving the TARU team on site.”; “The negativity of the DSNS representative and the state SNS coordinator.”; “Lecturing without class input

and trying to cover too much information in too little time."; and, "Too much focus on anthrax.".

Suggestions of other topics or activities to be included

A total of 50.8% (n = 21) provided suggestions on topics or activities that should be included to make this training course more effective. Some of the suggestions were: "Plans are flexible and only guidelines. SNS as a whole is overwhelming, but each person's piece is only a part of the whole. Preparation and planning occurs long before any event, not at the time of the event."; "Separate RSS training from the dispensing trainings. Addition of hands on site set up and data collection and inventory control at POD sites."; "Setting up a mini POD or clinic with the students to run a simulation at the end of the course."; "Include some specific ways (examples) to put together a command structure (ISC) for running an RDS and several PODS."; "More practice exercises with multiple disciplines"; "Expand beyond just POD staff training, have a course for decision makers as well."; "The hands-on applied section could be expanded."; "How the information is applicable to all-hazards scenarios. we are taught all-hazards, and much of the knowledge may be applicable to all-hazards, but CDC tends to keep blinders on and stick with only anthrax. RSS warehouse is the handling of goods and materials - but CDC only sees "SNS supplies" but the skills are applicable to managing supplies for many different emergencies."; "Understanding of logistical management/inventory control systems to be used in the management of the SNS"; "What actual experiences were used and worked in past events, i.e. Katrina, Haiti, Japan, Rita, etc."; "How to relate MAD to

all hazards."; "Need to begin to include all-hazards response and planning into the course for the other items that the SNS contains."; and, "Update the training and provide refresher training more frequently."

Discussion

The response rate for this study was 2.8%. Several factors may have caused this very low response rate. Although the solicitation email was sent to 32 SNS state coordinators and there were a total of 2059 individuals who attended the MAD training courses between 2006 - 2011. It is very difficult to determine whether the 2059 individuals were informed about this evaluation research study due to the manner in which the solicitation method was carried out. Since the MAD training course was conducted at the state level, the DSNS training team did not maintain records of past participants. Therefore, we were required to first forward the solicitation email through the state SNS coordinators. There were few state SNS coordinators that responded to the DSNS training team lead and/or the PI to inform them whether they were going to forward the email about the evaluation research project to their state's past MAD participants. In addition, it could also be possible that the current state SNS coordinators may be new to their positions and may not have records of individuals who participated in the MAD courses in the past years.

Overall, responses were very positive regarding the respondent's overall reaction of their satisfaction of the MAD training course. Respondents mostly agreed or strongly agreed with the in-class teaching style components such as in class lecture, group

discussion, and hand-on activity. Respondents indicated that those components helped them better understand and remember the training material. In addition, many respondents provided positive open-ended comments about their general reaction to the training course. Most comments discussed how participants felt the hand-on simulation activity during the training provided them the opportunity to practice what was just being taught in class and by doing so, allowed them the chance to remember the content more effectively.

Unlike most available training programs that mainly used lecture base format and lack skill training and opportunity for practice (43), the MAD training course uses a variety of teaching methods such as lecture, PowerPoint presentations, discussion sharing, and hands-on activities with a scenario or simulation. Many past studies have proven that simulation based education and training are practical and valid approach to prepare responders to respond to disaster events (101; 102). Furthermore, the literature has documented that interactive training methods have been shown to be effectively in increasing the quality of the training and improving retention of knowledge through immediate reinforcement of learning (15; 103–105).

Furthermore, the level of positive open-ended comments indicates that past MAD trainees felt very positive about the MAD training course that they have taken. In addition, results indicated that participants with less prior MAD knowledge, and participants with more MAD knowledge gained positive reaction to the training course. This association shows that participants with less prior MAD knowledge gained knowledge and retained it upon return to work. Additionally, because participants with

less prior MAD knowledge and participants with more MAD knowledge both reacted positively to the training, this occurrence could conclude that the training course succeeded in delivering the learning objectives.

Responses were also very positive in regards to participants overall general reaction to the learning content from the MAD training course. Participants mostly agreed or strongly agreed with the relevance of topics discussed at the training and how they were useful to their response role. Participants also provided positive feedback about the learning content obtained from the training course. The hands-on component was noted repeatedly as the most helpful tool in assisting them to recall learning materials from the course. This result reiterates the effectiveness of utilizing a hands-on method as a way to enhance learning effectiveness that has been proven in many past studies.

Results showed that the MAD objective knowledge test scores were not significantly associated with the participant's prior MAD knowledge, knowledge gained, or knowledge remembered. In addition, results also indicated that MAD knowledge retention was also not significantly associated with the year participants took the training course. The mean of the number correctly answered MAD knowledge questions were >14 out of 20. Many participants reported as sometimes or frequently using the knowledge and skills learned from the training in their response role. Also, many participants have applied knowledge and skills learned from the training to an emergency situation, event or to their response role. They thought that the knowledge and skills learned from the training courses allowed them to response to the situation more effectively. In addition, results found that those with less prior MAD knowledge, those

that have gained more knowledge, and those that have remembered more knowledge, were more likely to make changes or implement something new in their response role or organization's response mission.

Studies have proven that if trainees are not exposed to critical events on a regular basis, their knowledge and skills in responding to such events will start to decline 6 – 12 months after the initial training (39). With the majority of participants who reported applying something new to their response role or organization response operation, the majority has indicated they applied the knowledge within 1 – 6 months. This to a possible conclusion that although there was no relationship between prior knowledge, knowledge gained, and knowledge remembered; respondents continued to use their knowledge and have applied the knowledge and skills to their response role and/or in emergency situations, resulting in an acceptable mean score for the MAD objective test. This fact suggests that participants have learned a great deal of knowledge and also continued to remember that knowledge and skills obtained during training.

In terms of employment status and ability to apply something new, the majority of respondents have worked in their current employment position for less than five years reported that they have applied something new to their response role and/or their organization's response capabilities. The majority also indicated that it took them less than six months to implement those actions. For those who have worked in emergency response for less than five years and more than five years, both groups indicated that the training was significant in changing the way they performed in their response role. These

results agree with previous studies' findings that years of work experience as well as profession are associated with the extent of action taken at the workplace (98; 106–108).

Limitation

There were a few potential limitations in this study. The response rate of 2.8%, may have significantly contributed to social desirability bias and non-response bias. It could be argued that participants who felt more comfortable and had a more positive experience with the training course were more likely to respond to the survey. Participants who may not have a good experience with the training course may not have the interest to respond to the survey, as a result, it could be possible that negative responses were not recorded.

Having the survey online without an identification ID made it impossible to determine whether people had completed the survey more than once. However, it is very unlikely that anyone would have done so due to the lack of direct incentives and lengthiness of the survey. Also, it is possible that recall bias may have been presented. However, participants were asked to respond to the most recent training course they had participated; as a result, we are confident that recall bias was not presented to a large extent. Furthermore, the survey was relatively lengthy, and that access to computers and the Internet can be difficult within public health offices around the state.

In addition, data was collected based on a self-administered survey questionnaire completed by respondents. This process of data collection may underestimate the intervention effects if the respondents do not take the survey questionnaire seriously or

overestimate the study if respondents provided the answer that they thought the trainers would want them to provide.

C**onclusion**

Findings from this study showed that most respondents express satisfaction about their experiences in the MAD training course and the course material was relevant to their response role and organization. Individuals who participated in the training course with less prior knowledge have potential to gain more knowledge through the training course. More importantly, the majority of respondents indicated that they have applied knowledge and skills learned from the course to their response role and/or their organization's response capabilities.

Chapter 7: Conclusion and next steps

Education and training play a key role in the preparedness of local responders to effectively respond to emergency situations. As training initiatives across agencies increase, it is also critical to evaluate these training efforts to determine if training objectives are achieved and if they have contributed to a more effective response. This evaluation research has found significant findings on the effectiveness of the Strategic National Stockpile Training Program.

In summary, findings have shown that the Strategic National Stockpile Preparedness, Mobile Preparedness, and Mass Antibiotic Dispensing training courses have successfully disseminated key concepts, knowledge, and skills to the training participants. Participants knew more about the objectives and learning materials at the end than they did at the start of these courses. In general, responses were very positive regarding their overall satisfaction with the three training courses. Moreover, notable behavior changes and positive results have been reported within the individual as well as organization's response capabilities due to the knowledge and skills learned from these training courses.

The reduction of survey questions provided acceptable Cronbach's alphas for the reaction, learning, and behavior construct and produced a shorter survey. Unfortunately, the results construct delivered insufficient Cronbach's alphas with low and negative correlation coefficient. This limitation reiterates similar challenges found in previous evaluation efforts regarding the difficulties in measuring beyond the reaction level in the Kirkpatrick's model. Many training evaluation initiatives have attempted to adopt the

Kirkpatrick framework, however, very few have succeeded in their efforts beyond measuring the reaction level (74; 75). Likewise, studies have shown that very few research efforts have been made to collect information about the learning and behavior construct due to the difficulties of their methodology (76). Future evaluation efforts adapting Kirkpatrick's model as the main evaluation framework may consider exploring other evaluation models to utilize in place of or alongside with the Kirkpatrick's results construct to maximize the chance to obtain appropriate data for this specific construct.

It is important to note that respondents have consistently reported positively about the hands-on component of these training courses and on how it created the opportunity for them to remember the knowledge and skills learned from the course. Unlike most available training programs that mainly use lecture based training and lack the opportunity for practice (43), the SNS, MPC, and MAD training courses utilize a variety of teaching methods such as lecture based, PowerPoint presentation, discussion sharing, and hands-on activities with a scenario or simulation. This result restates the effectiveness of utilizing hands-on method as a way to enhance learning effectiveness that has been proven in many past studies. In addition, this finding reconfirms that interactive training methods are effective in increasing the quality of the training and improving retention rate of knowledge through immediate reinforcement (15; 103–105). Similarly, many past studies have proven that simulation based education and training to be a practical and valid approach to prepare responders for response to disaster events (101; 102).

The overall findings obtained from this study can be used to improve the effectiveness of the SNS training program. They are also useful for reinforcing the impact of training to improve public health preparedness funding sources in both the public and private sector. In addition, information collected also provides critical data for evaluating the progress and performance of the CDC DSNS training program. These findings provide baseline data for policy makers to evaluate existing programs in order to determine further continuation as well as expand successful programs and eliminate or modify ineffective ones.

In addition, it is worthy to note that the sufficient Cronbach's alpha estimates between the three constructs convey that these survey items can be beneficial for training evaluation at other agencies. There has been a lack of evaluation instruments established to measure training effectiveness in public health preparedness. A 2005 literature review describes the available 27 evaluation instruments used to evaluate multiple aspects of preparedness for public health emergencies. Of the 27 evaluation instruments reviewed, only four were issued by the state government (84–87) and ten by federal government agencies (27; 56; 57; 88–94).

Finally, it was consistently found that past participants of the SNS, MPC, and MAD training course were very willing to provide detailed qualitative feedback through open-ended questions included in the survey. This survey questionnaire allows for the concurrent collection of quantitative and qualitative information to provide more complete assessment of the training programs. This includes identifying training delivery factors as well as individual and organizational factors that may influence participants'

transfer of knowledge and skills learned from the training course to their individual and/or organizational response capabilities.

In summary, this research study reinforces that evidence-based training continues to be a key component of preparedness planning and response activities designed to prepare the nation to effectively prepare for, respond to and recover from public health emergencies and natural disasters. The US federal government has been providing the states and sub-agencies billions of dollars in public health preparedness and response funds since 2001. More than a decade has passed with very few efforts or funds made available to measure the effectiveness of these programs. This three-part survey questionnaire is a step forward in providing information and resources for standardizing program evaluation not only for the CDC DSNS training program, but also for state and local public health agencies.

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Appendix A: Survey Solicitation Message for Pilot Study

To past SNS course participants,

I am writing you today to solicit your participation in a University of Minnesota School of Public Health research project designed to measure the effectiveness of DSNS-provided training over the last 4 years. You have been selected because our records indicate you attended a DSNS course in **2007**. We will use this information from the project to upgrade our training products to help improve public health preparedness. To participate you will take a survey and a short test, both should take approximately 25 minutes to complete. Your assistance in this project would be appreciated.

If you are willing to participate, please click on or paste in your web browser the link below:

https://live.datstat.com/DCSS-Collector/Survey.ashx?Name=CDCProgramEvalCohort2

NOTE: The project number is 1007E86033.

There is no requirement for you to participate in this research. Your participation is voluntary.

If you would like more information regarding the survey, please contact Ms. Thuy Doan at doanx034@umn.edu or her advisor Debra Olson at olson002@umn.edu. Ms. Doan and Dr. Olson are part of the university's simulations and exercises for educational effectiveness research team. More information about their work is viewable here.

This research project is a part of a CDC-funded grant authorized by the Pandemic and All-Hazards Act of 2006 (Public Law 109-417). The University of Minnesota is one of six preparedness and emergency response research centers funded by CDC to conduct research like this survey I am asking you to participate in.

I hope that the information gathered in this project will lead to improvements in the courses that DSNS provides in the future and that those improvements will ultimately lead to enhanced national preparedness. Thank you.

Tom Jackson
Training Team Lead
Division of Strategic National Stockpile
Office of Public Health Preparedness and Response
Centers for Disease Control and Prevention
2960 Brandywine Road, Room 2036
Atlanta, GA 30341
Phone (770) 488 – 2420/Cell (404) 661 – 5510 Email: Tgj7@cdc.gov

Appendix B: Pilot Study Survey

Welcome to the CDC
Division of Strategic National Stockpile Training Program Survey Questionnaire

Greetings!

Thank you for your interest and willingness to complete this survey. Your feedback and participation will help public health trainers across the nation improve their training programs. These improvements will lead to greater response capabilities at all levels to protect the health security of the Nation.

There is no requirement for you to participate. We know that you are busy and your time is valuable. Equally valuable is your opinion on how trainers can improve public health preparedness. The information all of us can glean from this study will help create efficient and effective training programs - programs that will help secure the Nation's health now and in the future. Below you will find detailed information about this research study.

Background Information:
The purpose of this research study is to evaluate if education and training programs fostered knowledge retention and improved individual and/or system performance in public health disaster preparedness and response activities. This project (1007E86033) was submitted and approved by the University of Minnesota School of Public Health Institutional Review Board.

Procedures:
If you agree to participate in this study, you will take a short survey questionnaire and a short knowledge test. Both together should take about 25 minutes to complete.

Benefits of being in the Study:
There are no direct benefits by participating in this research study. However, this research study is expected to yield knowledge about the delivery and content of the training program. Your feedback will be highly valuable in shaping future initiatives and ensuring effective training programs.

Compensation:
You will not be paid to participate in this study and there will be no cost to you from taking part in this study.

Confidentiality:
All information gathered from the study will remain confidential. Your identity will not be disclosed to any unauthorized persons. The records of this study will be kept private.

In any sort of report we might publish, we will not include any information that will make it possible to identify you as a participant.

Voluntary Nature of the Study:
Participation in this study is voluntary. If you decide to participate, you do not have to answer all the questions, and you may withdraw at any time.

Contacts and Questions:
If you'd like more information, you can contact Ms. Doan directly at her email address doanx034@umn.edu or phone at (571) 327-6725, or her PhD advisor Debra Olson DNP, MPH at olson002@umn.edu.

If you have any technical difficulty, you can contact Megan Johanknecht at joha0132@umn.edu.

By beginning the survey, you acknowledge that you have read this information and agree to participate in this research study.

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1. **Please think about the Division of Strategic National Stockpile training course(s) you have attended (listed below) and indicate which training course you took *most recently*.**
a) ___ Strategic National Stockpile Preparedness Course (held only in Atlanta, GA)
b) ___ Mobile Preparedness Course (MPC, held in state, regional, or city locations)
c) ___ Mass Antibiotic Dispensing (MAD, held in state, regional, or city locations)

2. **In what year did you complete this course?**
a) 2006
b) 2007
c) 2008
d) 2009
e) 2010

Answer the following questions based on your experience from the most recent training course you have taken.

3. **Since the date you completed the most recent training course, are you still...**

…in the same emergency response role?
a) Yes
b) No

…working at the same organization?

a) Yes
b) No

4. **Please rate your agreement or disagreement with the following statements related to your general reaction to the most recent training course you took from CDC DSNS.**

Overall reaction to the course	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	N/A
a) Overall, the training course met my expectations.						
b) The in-class lectures helped me understand the materials being presented in the training.						
c) The in-class group discussions helped me understand the materials being presented in the training.						
d) The hands-on components helped me remember the skills I learned from the training.						
e) Based on my experience with this training session, I would probably attend another training course from CDC DSNS.						
f) I would recommend this course to my colleagues.						

5.**Please indicate any comments about your overall reaction to the course:**

6.**Please rate your agreement or disagreement with the following statements related to the content of the training course you most recently took from CDC DSNS.**

Course content	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	N/A
a) The topics discussed were relevant to my response role.						
b) The topics discussed were relevant to my organization.						
c) The training course enhanced my knowledge of problem solving for my response role.						
d) The training course enhanced my knowledge of decision making for						

my response role.						
e) The materials presented were appropriate for my skill level.						
f) The training experience was useful for my response role.						
g) The materials provided were useful resources for my response role.						
h) My performance was improved by attending this training course.						

7. **Please indicate any comments about the content of the course:**

8. **How much knowledge about the course material do you think you *had before attending* this training course?**

a) No knowledge prior to training
b) Very little knowledge
c) Some knowledge
d) A lot of knowledge
e) A great deal of knowledge

9. **How much knowledge about the course material do you think you *gained during* this training course?**

a) No new knowledge
b) Very little knowledge
c) Some knowledge
d) A lot of knowledge
e) A great deal of knowledge

10. **Currently, approximately how much knowledge about the course material do you think you still *remember from* this training course?**

f) No new knowledge
g) Very little knowledge
h) Some knowledge
i) A lot of knowledge
j) A great deal of knowledge

11. **To what degree do you think you applied the knowledge and skills learned from this training course to your response role?**

a) None at all
b) Very little application of knowledge and skills
c) Some application of knowledge and skills
d) A lot of knowledge and skills applied
e) A great deal of knowledge and skills applied

12. **In general, how often have you used the knowledge and skills that you obtained**

from the training for your response role?

a) Never
b) Sometimes
c) Frequently
d) Always

13. **How significant do you think the training was in changing the way you perform in your response role today?**

a) Very significant
b) Somewhat significant
c) Significant
d) Not very significant
e) Not at all significant

14. **How significant do you think your new knowledge and skills have been to your organization's response mission?**

a) Very significant
b) Somewhat significant
c) Significant
d) Not very significant
e) Not at all significant

15. **After attending the training course, were there any emergency situations or events that arose in which you were able to apply the knowledge and skills you learned?**

a) Yes, please briefly describe:
b) No

16. **Did the knowledge and skills gained from this training course allow you to respond more effectively to the situation indicated in the previous question?**

a) Yes
b) No
c) Maybe

17. **What are the most important item(s) you learned from this training course that you can still remember?**

If you do not remember anything from the training course, please indicate that.

18. **After the training course, how eager were you to apply the new knowledge and skills gained to your response role or your organization's response mission?**

a) Very eager
b) Somewhat eager
c) Neutral
d) Not very eager

e) Not at all eager

19. **Did your experience with this training course lead you to want to make changes to your organization's response plans, Standard Operation Procedures, processes, etc.?**
a) Yes
b) No
c) Maybe

20. **After the training course did the information from the course stimulate you to change or implement anything new in your response role or your organization's response operations?**
a) Yes
b) No

21. **Did you do anything differently or apply anything new to your response role or you organization's response capabilities that you learned from this training course?**
a) Yes
b) No, please provide an explanation:

22. **What did you do differently or apply to your response role or your organization's**
response capabilities when returning from this training course?

23. **To what degree, overall, did you feel like at the time you wanted to accomplish these items?**
a) Very much
b) Somewhat
c) Neutral
d) Not very much
e) Not at all

24. **How long after completing this training course did you apply the action item(s) indicated in the previous question?**
a) Immediately
b) Approximately within 1-3 months
c) Approximately within 3-6 months
d) Approximately within 6-12 months
e) Approximately more than 1 year
Approximately more than 2 years
Other, please indicate:

25. **In the process of implementing the action items you previously indicated, did you encounter any organizational *challenges* that made it difficult?**
a) Yes

b) No

26. **Please select any of the following statement(s) that best describe the challenges you encountered:**
a) It wasn't practical for my situation.
b) I couldn't find the time.
c) I already had too many projects to do.
d) I recently changed my response role.
e) Resources were not available at my organization for this change.
f) Other, briefly describe:

27. **Did you encounter any organizational assistance or support that made the process easier?**
a) Yes, please describe:
b) No

28. **Do you want to add any new plan to apply anything new relating to what you learned from the training course to your response role as a result of taking this survey questionnaire?**
a) Yes. Please indicate:
b) No. Please provide your rationale:

29. **Overall, to what degree do you feel like you want to achieve this/these *new* action item(s)?**
a) Very much
b) Somewhat
c) Neutral
d) Not very much
e) Not at all

30. **Have you taken any of the following actions as a result from taking this training course? (Select all that apply.)**
a) Developed an all-hazards emergency response plan
b) Updated an all-hazards emergency response plan
c) Planned strategic sites for Receiving, Staging, and Storing
d) Planned sites for possible Points of Dispensing (POD)
e) Conducted an exercise for Points of Dispensing (POD)
f) Conducted a real event for Points of Dispensing (POD)
g) Other, please indicate:

31. **Do you think this training course helped you do a better job in completing the action(s) you selected in the previous question?**
a) Yes
b) No
c) Maybe

32. **What are you *doing currently* in your response role that you did not do before attending this training course?**

33. **What are you *not doing currently* in your response role that you did before attending this training course?**

34. **What did you find *most effective* about this training experience?**

35. **What did you find *least effective* about this training experience?**

36. **Based on your knowledge and work experience, what other topics or activities do you think should be included to make this training more effective?**

37. **What other comments, observations, and/or suggestions can you share?**

Now we would like you to complete a short knowledge test about the Strategic National Stockpile Preparedness Training Course.

To help you remember, the overall objectives for this course are: to provide information and train federal, state, and local planners and officials on how to best use and manage SNS assets in response to a terrorist attack, natural disaster, or technological accident.

38. **The Strategic National Stockpile (SNS) is a national repository of medicine and medical supplies that is designed for delivery to state and local public health agencies in the event of a biological and/or chemical terrorism incident anywhere, at anytime within the U.S.**
a) true
b) false

39. **The Division of Strategic National Stockpile (SNS) is committed to:**
a) deliver medical supplies within 12 hours after authorization to deploy
b) provide support for as long as it is needed
c) update inventory in stock to ensure it supports the needs of states
d) coordinate with Congress for funding
e) all of the above

40. **Select the following statement(s) that best describe how Division of Strategic National Stockpile responds to an emergency event:**
a) provides rapid delivery of broad spectrum of medical supplies when the threat is unknown
b) coordinates with nongovernmental agencies to provide volunteer support
c) secures immediate funding from Congress to assist with the response

d) b & c
e) all of the above

41. **Select the following statement(s) that best describe a 12-hour Push Package:**
a) is in pre-packaged, transport-ready, color coded containers
b) contains all the different types of vaccines the SNS has
c) is delivered to the multiple reception points designated by the state
d) all the above

42. **In general, the federal government is responsible for transporting SNS assets to the state designated RSS site, the state is responsible for receiving the assets and distribution to PODs and treatment sites, and local jurisdictions are responsible for dispensing the assets.**
a) true
b) false

43. **When receiving the 12-hour Push Package, it is important to:**
a) activate the Receiving, Storing and Staging (RSS) warehouse and brief warehouse crew on the implementation plan
b) designate receiving, staging, and shipping areas
c) ensure that all expected containers are received
d) position the containers according to the plan
e) all of the above
f) none of the above

44. **The "head of household" concept in POD operations allows for:**
a) mail service delivery of one bottle of pills per each house
b) the head of household can select who will pick up medications for themselves and their family members
c) the head of a household can pick up medications for their family members
d) a & b
e) a & c

45. **Emergency Use Authorization (EUA) allows "...the use of an unapproved medical product or an unapproved use of an approved medical product during a declared emergency involving a heightened risk of attack on the public..." The authority to issue an EUA rests at what level of government?**
a) state
b) county
c) federal
d) no government level - physicians can authorize

46. **Select the following statement(s) that best describe a "closed POD":**
a) a location where medications are dispensed to a specific population group

b) a POD that is no longer in operation
c) a POD that is not open to people without a current state issued drivers license
d) a method to decrease the number of people going to "open" PODs
e) a & d

47. **The label of a drug must have information according to the federal law including (but not limited to):**
a) name of drug, expiration date, and direction for use
b) name and place of the manufacturer/distributor
c) quantity of contents
d) lot number
e) all of the above
f) none of the above

48. **Emergency Investigational New Drug (IND) can best be described as:**
a) physicians prescribing drugs "off label" to respond to a public health emergency
b) a paperwork-free process that allows new drugs to be used in certain emergency situations
c) allows the FDA to authorize use of an experimental drug in an emergency situation
d) all of the above
e) none of the above

49. **The primary goal of the public information and communication (PIC) campaign is to inform the public, the media, partners and stakeholders about the risks associated with the real or apparent threat to:**
a) reduce fear
b) mobilize the public to go to and get through dispensing sites
c) educate the public about medication they may receive
d) provide follow-up health campaigns post-event
e) all of the above
f) none of the above

50. **Select the following statement that best describes "distribution networks":**
a) the way that SNS assets flow from state RSS facility to local Points of Dispense and treatment centers
b) the geographic connection between POD locations for coordination of distribution operations
c) must contain intermediate distribution nodes to be considered a proper distribution network
d) the media networks needed to tell the population about how the state is distributing the medical supplies
e) all of the above

51. **Common elements in planning to maximize volunteer efforts include:**

a) designate a state volunteer coordinator and staff
b) a recruitment program that draws from appropriate community resources and maintains accurate records on potential volunteers
c) an effective training program for all volunteers to regularly exercise volunteers to maintain interest and skill levels
d) an evaluation mechanism to assess volunteer performance and program effectiveness post event or post exercise
e) all of the above
f) none of the above

52. **The four basic functional areas of a POD are:**
a) intake, screening, dispensing and exit
b) security, screening, dispensing, and monetary reimbursement
c) screening, dispensing, educate, and exit
d) intake, dispensing, screening, and monetary reimbursement

53. **In an anthrax attack, the public is directed to go to a staging site. At the site, responders conduct a quick screening to determine if anyone has symptoms. Those without symptoms are directed to get on a bus that will take them to a POD. This is an example of a:**
a) mega POD operation
b) non-segmented POD
c) segmented POD
d) staging site POD
e) c & d

54. **Which one listed below is NOT an alternate method of dispensing?**
a) closed PODs
b) drive through PODs
c) direct delivery through the SNS ordering website
d) none...all of the answers above are alternate methods
e) all...all of the answers above are alternate methods

55. **POD site selection criteria may include:**
a) familiar sites in the community (voting locations, school, churches) and geographically dispersed
b) service by mass transit
c) adequate parking space
d) able to be secured
e) all of the above
f) none of the above

56. **A mass prophylaxis plan should consider two basic concepts for dispensing operations. Those concepts are generally referred to as the "pull" and "push"**

methods. The push method is when people come to where the medications are, and the pull method is when the medications are brought to where the people are.
a) true
b) false

57. **PODs should use ICS methods of organization for their operations.**
a) true
b) false

58. **Some of the responsibilities of a POD manager include:**
a) set-up and operate the POD according to state/regional or local plan
b) responsible for information flow and reporting requirements
c) authorize changes in planning and coordinates the activities of the management staff
d) none of the above
e) all of the above

Now we would like you to complete a short knowledge test about the Mobile Preparedness Training Course.

To help you remember, the course objectives are: to provide state, local and tribal officials with the knowledge, skills, and tools necessary to receive, distribute, and dispense strategic national stockpile assets.

59. **Select the following statement(s) that best describe a 12-hour Push Package:**
a) pre-packaged and in transport-ready containers that can be delivered to anywhere in the country within 12 hours or less after release authority
b) contains specific items when delivered to the emergency site
c) contains sufficient antibiotics to begin individual, 10-day regimens for over 400,000 people
d) is delivered to the single reception point that a state designates
e) a, c & d
f) b & c

60. **What items are NOT contained in a 12-hour Push Package?**
a) airway management supplies
b) portable ventilators
c) antibiotics
d) intravenous supplies
e) all of the above

61. **When receiving the 12-hour Push Package, it is important to:**
a) activate the Receiving, Storing, and Staging (RSS) warehouse and brief warehouse crew on the implementation plan

b) designate receiving, staging, and shipping areas
c) ensure that all expected containers are received
d) position the containers according to the RSS plan
e) all of the above
f) none of the above

62. **A Receiving, Storing, and Staging facility must have a loading dock to receive SNS assets.**
a) true
b) false

63. **Managed inventory items that follow a 12-hour Push Package are on pallets and not in containers.**
a) true
b) false

64. **The main purpose of mass antibiotic dispensing operations is/are too:**
a) provide medication to *x* number of population in a *x* amount of time to decrease illnesses
b) provide information about the threat or the emergency event that is occurring
c) provide free food, medications, and information about the emergency event to anyone who is interested
d) a & b
e) a & c

65. **What issues should be considered when planning a dispensing campaign?**
a) notification and recall of critical infrastructure
b) prophylaxis of critical infrastructure and families
c) establishing points of dispensing for medication distribution
d) notification of the public about the emergency event and what they should do to prevent getting sick
e) all of the above
f) none of the above

66. **Select the following statement that best describes the "Push" method for dispensing planning:**
a) bringing people to where the medications are
b) brining the medications to where people are
c) pushing information to the media about the event

67. **The "head of household" concept in POD operations allows for:**
a) mail service delivery of one bottle of pills per each house
b) the head of household can select who will pick up medications for themselves and their family members

c) the head of a household can pick up medications for their family members
d) b & c
e) all of the above

68. **Select the following statement(s) that best describe a "closed POD":**
a) a location where medications are dispensed to a specific population group
b) a POD that is no longer in operation
c) a POD that is not open to people without a current state issued drivers license
d) a method to decrease the number of people going to "open" PODs
e) all of the above

69. **A POD that receives customers at a staging area, does an initial screening, then puts them on a bus to go to another location where dispensing will happen is an example of a:**
a) non-segmented POD
b) segmented POD
c) multi-directional POD
d) a & c
e) none of the above

70. **Which one listed below is NOT an alternate method of dispensing?**
a) closed PODs
b) drive through PODs
c) direct delivery through the SNS ordering website
d) none...all the answers above are alternate methods

71. **POD site selection may include:**
a) familiar site in the community and geographically dispersed
b) service by mass transit
c) adequate parking space
d) secured
e) all of the above

72. **For mass prophylaxis operations, dispensing is defined as getting the pills in the people. Distribution is defined as moving the SNS assets from the state RSS site to the PODs or treatment centers.**
a) true
b) false

73. **The four basic functional areas of a POD are:**
a) intake, screening, dispensing, and exit
b) security, screening, dispensing, and monetary reimbursement
c) screening, dispensing, educate, and exit
d) intake, dispensing, screening, and monetary reimbursement

e) none of the above

74. **Once the state signs for the SNS assets at the RSS warehouse, responsibility for the security of those assets belongs to:**
a) the U.S. Marshal Service
b) the Department of Homeland Security
c) state law enforcement activity
d) local law enforcement activity
e) all of the above

75. **Three sources for volunteers for mass prophylaxis operations are the American Red Cross, faith-based organizations, and fraternal organizations.**
a) true
b) false

76. **Just-In-Time Training is a critical part of POD operations, as it:**
a) supplements periodic trainings and exercises with materials that will be used in the POD
b) trains specific tasks and duties for a specific event
c) shortens time between learning and application
d) builds into POD set up time schedule
e) all of the above
f) none of the above

77. **The primary goal of the public information and communication (PIC) campaign is to inform the public, the media, partners and stakeholders about the risks associated with the real or apparent threat to:**
a) reduce fear
b) mobilize the public to go to and get through dispensing sites
c) educate the public about medication they may receive
d) all of the above
e) none of the above

78. **What are some messages that will help move people to the dispensing site?**
a) provide event-specific information
b) provide information about "what is happening?"
c) provide information about "who is affected?"
d) provide information about "what is being done?"
e) all of the above

Now we would like you to complete a short knowledge test about the Mass Antibiotic Dispensing Training Course.

To help you remember, the course objectives are: to provide Point of Dispensing managers, local and state planners, and POD staff members the knowledge, skills, and tools necessary to dispense SNS medical countermeasures. At the completion of training, the course participants will be able to determine how to receive and handle SNS assets in a dispensing site during a public health emergency.

79. **The Strategic National Stockpile (SNS) is a national repository of medicine and medical supplies that is designed for delivery to state and local public health agencies in the event of a biological and/or chemical terrorism incident anywhere, at anytime within the U.S.**
a) true
b) false

80. **The Division of Strategic National Stockpile (SNS) is committed to:**
a) deliver medical supplies within 12 hours of authorization to deploy
b) provide support for as long as it is needed
c) coordinate with Congress for funding
d) all of the above
e) a & b

81. **Select the following statement(s) that best describe how the Division of Strategic National Stockpile responds to an emergency event:**
a) provides rapid delivery of broad spectrum of medical supplies when the threat is unknown
b) provides large shipments of specific medical supplies when a threat is known
c) provides technical responders to assist with management and coordination of SNS assets
d) a, b & c
e) none of the above

82. **Select the following statement(s) that best describe a 12-hour Push Package:**
a) pre-packaged and in transport-ready containers that can be delivered to anywhere in the country within 12 hours or less in an emergency event after release is authorized
b) contains all the different types of vaccines the SNS has
c) contains all the paperwork a city needs to dispense medications
d) is delivered to the multiple reception points designated by the state
e) all of the above

83. **The main purpose of mass antibiotic dispensing operations is/are to:**
a) provide medication to *x* number of population in a *x* amount of time to decrease the rise of illnesses
b) provide information about the threat or the emergency event that is occurring
c) provide free food, medications, and information about the emergency event to anyone who is interested

d) a & b
e) a & c

84. **What issues should be considered when planning a dispensing campaign?**
a) notification and recall of critical infrastructure
b) prophylaxis of critical infrastructure and families
c) establishing points of dispensing for medication distribution
d) notification of the public about the emergency event and what they should do to prevent getting sick
e) all of the above
f) none of the above

85. **In general, the federal government is responsible for transporting SNS assets to the state designated RSS site, the state is responsible for receiving the assets and distribution to PODs and treatment sites, and local jurisdictions are responsible for dispensing the assets.**
a) true
b) false

86. **The "head of household" concept in POD operations allows for:**
a) mail service delivery of one bottle of pills per each house
b) the head of household can select who will pick up medications for themselves and their family members
c) the head of a household can pick up medications for their family members
d) b & c

87. **The four basic areas of a POD set up, in sequential order are:**
a) intake, screening, dispensing, and exit
b) security, screening, dispensing, and monetary reimbursement
c) screening, dispensing, educate, and exit
d) intake, dispensing, screening, and monetary reimbursement
e) all of the above

88. **A POD can be designed as:**
a) non-segmented
b) segmented
c) multi-directional
d) a & b
e) a, b & c

89. **Select the following statement(s) that best describes the "Push methods" of dispensing:**
a) bring people to where the medications are
b) bring the medications to where the people are

c) mail the medications to where the people live

90. **Which one listed below is NOT an alternate method of dispensing?**
a) closed PODs
b) drive through PODs
c) direct delivery through the SNS ordering website
d) none of the answers above are alternate methods

91. **Select the following statement(s) that best describe possible action items when establishing a POD:**
a) decide whether the POD will utilize the Push or Pull method
b) establish memoranda of agreement with the facility that will be used for a POD
c) decide on the locations and hours of operation for a POD
d) decide how to reach special needs or at risk populations during a dispensing event
f) all of the above

92. **PODs should use ICS methods of organization for their operations.**
a) true
b) false

93. **Some of the responsibilities of a POD manager include:**
a) set-up and operate the POD according to state/regional or local plan
b) responsible for information flow and reporting requirement
c) authorize changes in planning and coordinates the activities of the staff
d) none of the above
e) all of the above

94. **In an anthrax attack, the public is directed to go to a staging site. At the site, responders conduct a quick screening to determine if anyone has symptoms. Those without symptoms are directed to get on a bus that will take them to a POD. This is an example of a:**
a) mega POD operation
b) non-segmented POD
c) segmented POD
d) staging site POD
e) b & d

95. **Common elements in planning to maximize volunteer efforts include:**
a) designate a state volunteer coordinator and staff
b) a recruitment program that draws from appropriate community resources and maintains accurate records on potential volunteers
c) an effective training program for all volunteers to regularly exercise volunteers to maintain interest and skill levels
d) an evaluation mechanism to assess volunteer performance and program

effectiveness post event or post exercise
e) all of the above
f) none of the above

96. **The primary goal of the public information and communication (PIC) campaign is to inform the public, the media, partners and stakeholders about the risks associated with the real or apparent threat to:**
a) reduce fear
b) mobilize the public to go to and get through dispensing sites
c) educate the public about medications they may receive
d) provide follow-up health campaigns post event
e) all of the above

97. **What are some messages that will help move people to the dispensing site?**
a) provide event-specific information
b) provide information about "what is happening?"
c) provide information about "who is affected?"
d) provide information about "what is being done?"
e) all of the above
f) none of the above

98. **What are some considerations for a media visit to an operational POD during an emergency event?**
a) designate an area for media at the POD
b) identify a person responsible for escorting the media through the POD
c) coordinate with the appropriate public information officer (PIO)
d) identify media policies in advance before the event occurs
e) all of the above
f) none of the above

99. **The label of a drug must have information according to the federal law including (but not limited to):**
a) name of drug, expiration date, and direction for use
b) name and place of the manufacturer/distributor
c) quantity of contents
d) lot number
e) all of the above

Finally, to help us interpret these results, there are just a few more questions about your background.

100. **What is your primary job title or role?**

101. **What state is your job location?**

102. **During an emergency response, what will be your primary job title or role?**

103. **If you work for a government agency, at which level of government do you work?**
a) City
b) County
c) Tribal
d) Regional
e) State
f) Federal
g) I do not work for a government agency

104. **What type of agency do you represent?**
a) Emergency Management
b) Public Health
c) Law Enforcement
d) Military
e) Hospital/Treatment Center
f) Indian Health Service
g) Tribal or Intertribal
h) Other (please indicate):

105. **How long have you been working at your current agency?**
a) Less than 1 year
b) 1 - 5 years
c) 5 - 10 years
d) 10 - 15 years
e) 15 - 20 years
f) 20+ years

106. **How long have you been working in your current position?**
a) Less than 1 year
b) 1 - 5 years
c) 5 - 10 years
d) 10 - 15 years
e) 15 - 20 years
f) 20+ years

107. **How long have you been working in an emergency response area (either Strategic National Stockpile area or other)?**
a) Less than 1 year
b) 1 - 5 years
c) 5 - 10 years

d) 10 - 15 years
e) 15 - 20 years
f) 20+ years

108. **Where would you work during an emergency response? (Select all that apply.)**
a) Point of Dispensing
b) State of Local Emergency Operations Center
c) Receipt, Store, and Distribute Facility
d) Treatment Center
e) Reservations/Tribal Lands
f) Other (please indicate):

109. **What is your primary function in an emergency response?**
a) Planner
b) Supervisor/Manager
c) Coordinator
d) Dispenser
e) Inventory Management
f) Volunteer
g) Other (please indicate):

110. **Has your *organization* completed any of the following actions? (Select all that apply.)**
a) Developed an all-hazard emergency response plan
b) Recently updated an all-hazard emergency response plan
c) Planned strategic sites for Receiving, Staging, and Storing
d) Planned sites for possible points of dispensing
e) Conducted an exercise for points of dispensing
f) Conducted a real event for points of dispensing
g) Other (please indicate):

111. **Why did you participate in this training program? (Select all that apply.)**
a) Required by my organization to attend this training program
b) To enhance my knowledge and keep up with current issues in strategic national
c) stockpile
d) To network with other people who work in strategic national stockpile related areas
e) To get help with my local strategic national stockpile plan
f) Other (please indicate):

112. **In addition to any training courses you are currently attending, have you or are you planning to participate in any other CDC SNS sponsored training courses? (Select all that apply.)**
a) Yes, I **have** attended other CDC SNS training courses. (Please list these courses):
b) Yes, I **plan** to attend other CDC SNS training courses. (Please list courses you plan to attend):

c) No, I have not attended nor plan to attend other CDC SNS training courses.

113. **Have you participated or are planning to participate in any other emergency preparedness and response (EP&R) training courses from other organizations? (Select all the apply.)**
a) Yes, I **have** attended other (EP&R) training courses. (Please list these courses):
b) Yes, I **plan** to attend other (EP&R) training courses. (Please list courses you plan to attend):
c) No, I have not attended nor plan to attend other (EP&R) training courses.

114. **What is the highest level of education you have completed?**
a) High School Graduate
b) Associates Degree
c) Bachelors Degree
d) Masters Degree (MBA, MPH, etc)
e) Doctoral Degree (JD, MD, or PhD)
f) Other (please indicate):

115. **What is your gender?**
a) Male
b) Female

116. **What age group best describes you?**
a) 18 - 29 years of age
b) 30 - 39 years of age
c) 40 - 49 years of age
d) 50 - 59 years of age
e) 60 years of age or older

117. **Are you Hispanic or Latino?**
a) Yes
b) No
c) Don't know / Not sure

118. **Which of the following best describes you? (Check all that apply)**
a) White
b) Black or African American
c) Asian
d) Native Hawaiian or Pacific Islander
e) Alaskan Native or American Indian
f) Other (please indicate):

Thank you for your time and please make sure to click "SUBMIT" before exiting the survey.

Appendix C: Invitation Email to SNS Participants for Full Study

To past SNS course participants,

I am writing you today to solicit your participation in a University of Minnesota School of Public Health research project designed to measure the effectiveness of DSNS-provided training over the last 4 years. You have been selected because our records indicate you attended a DSNS course in **2007**. We will use this information from the project to upgrade our training products to help improve public health preparedness. To participate you will take a survey and a short test, both should take approximately 20 minutes to complete. Your assistance in this project would be appreciated.

If you are willing to participate, please click on or paste in your web browser the link below:

https://live.datstat.com/DCSS-Collector/Survey.ashx?Name=CDCProgramEvalCohort2

NOTE: The project number is 1007E86033.

There is no requirement for you to participate in this research. Your participation is voluntary.

If you would like more information regarding the survey, please contact Ms. Thuy Doan at doanx034@umn.edu or her advisor Debra Olson at olson002@umn.edu. Ms. Doan and Dr. Olson are part of the university's simulations and exercises for educational effectiveness research team. More information about their work is viewable here.

This research project is a part of a CDC-funded grant authorized by the Pandemic and All-Hazards Act of 2006 (Public Law 109-417). The University of Minnesota is one of six preparedness and emergency response research centers funded by CDC to conduct research like this survey I am asking you to participate in.

I hope that the information gathered in this project will lead to improvements in the courses that DSNS provides in the future and that those improvements will ultimately lead to enhanced national preparedness.

Thank you,
Tom Jackson
Training Team Lead
Division of Strategic National Stockpile
Office of Public Health Preparedness and Response
Centers for Disease Control and Prevention
2960 Brandywine Road, Room 2036
Atlanta, GA 30341
Phone (770) 488 – 2420 / Cell (404) 661 – 5510 / Email: Tgj7@cdc.gov

Appendix D: Invitation Message to State SNS Coordinators for Full Study

To state SNS coordinators,

I am writing you today to solicit your participation in a University of Minnesota School of Public Health research project designed to measure the effectiveness of training provided by CDC's Division of Strategic National Stockpile (DSNS) over the last 4 years. We are asking your participation because your state hosted a DSNS-sponsored course (either the Mobile Preparedness Course (MPC), or the Mass Antibiotic Dispensing Course (MAD)) during the 2006 to 2011 time frame. You can find your state, course names, and course dates on the next page.

To get as many responses as possible, we would like for you, the study project manager, or the DSNS Training Team to contact the students to ask for their participation.

There are three ways to contact the students

- If you wish to contact the students yourself, you can send them the attached message.
- If you wish for the DNS Training Team to contact the students, you can email the course roster(s) to tgj7@cdc.gov.
- If you wish for the project manager, Ms. Thuy Doan, to contact the students, you can email the course roster(s) to doanx034@umn.edu.

We will use the information gained from this project to upgrade our training products to help improve public health preparedness. To participate, students will take a survey and a short test, both should take approximately 25 minutes to complete.

Your assistance in this project would be appreciated.

NOTE: The project number is 1007E86033.

There is no requirement for you to participate in this research. Your participation is voluntary.

If you would like more information regarding the survey, please contact Ms. Thuy Doan at doanx034@umn.edu or her advisor Debra Olson at olson002@umn.edu. Ms. Doan and Dr. Olson are part of the university's simulations and exercises for educational effectiveness research team. More information about their work is viewable here.

This research project is a part of a CDC-funded grant authorized by the Pandemic and All-Hazards Act of 2006 (Public Law 109-417). The University of Minnesota is one of six preparedness and emergency response research centers funded by CDC to conduct research like this survey I am asking you to participate in.

I hope that the information gathered in this project will lead to improvements in DSNS' courses and that those improvements will ultimately lead to enhance national preparedness.

Appendix E: Full Study Survey

Welcome to the CDC
Division of Strategic National Stockpile Training Program Survey Questionnaire

Greetings!

Thank you for your interest and willingness to complete this survey. Your feedback and participation will help public health trainers across the nation improve their training programs. These improvements will lead to greater response capabilities at all levels to protect the health security of the Nation.

There is no requirement for you to participate. We know that you are busy and your time is valuable. Equally valuable is your opinion on how trainers can improve public health preparedness. The information all of us can glean from this study will help create efficient and effective training programs - programs that will help secure the Nation's health now and in the future. Below you will find detailed information about this research study.

Background Information:
The purpose of this research study is to evaluate if education and training programs fostered knowledge retention and improved individual and/or system performance in public health disaster preparedness and response activities. This project (1007E86033) was submitted and approved by the University of Minnesota School of Public Health Institutional Review Board.

Procedures:
If you agree to participate in this study, you will take a short survey questionnaire and a short knowledge test. Both together should take about 20 minutes to complete.

Benefits of being in the Study:
There are no direct benefits by participating in this research study. However, this research study is expected to yield knowledge about the delivery and content of the CDC DSNS training program. Your feedback will be highly valuable in shaping future initiatives and ensuring effective training programs.

Compensation:
You will not be paid to participate in this study and there will be no cost to you from taking part in this study.

Confidentiality:
All information gathered from the study will remain confidential. Your identity will not be disclosed to any unauthorized persons. The records of this study will be kept private.

In any sort of report we might publish, we will not include any information that will make it possible to identify you as a participant.

Voluntary Nature of the Study:
Participation in this study is voluntary. If you decide to participate, you do not have to answer all the questions, and you may withdraw at any time.

Contacts and Questions:
If you'd like more information, you can contact Ms. Doan directly at her email address doanx034@umn.edu or phone at (571) 327-6725, or her PhD advisor Debra Olson DNP, MPH at olson002@umn.edu.

If you have any technical difficulty, you can contact Megan Johanknecht at joha0132@umn.edu.

By beginning the survey, you acknowledge that you have read this information and agree to participate in this research study.

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1. **Please think about the Division of Strategic National Stockpile training course(s) you have attended (listed below) and indicate which training course you took *most recently*.**
a) ___ Strategic National Stockpile Preparedness Course (held only in Atlanta, GA)
b) ___ Mobile Preparedness Course (MPC, held in state, regional, or city locations)
c) ___ Mass Antibiotic Dispensing (MAD, held in state, regional, or city locations)

2. **In what year did you complete this course?**
a) 2006
b) 2007
c) 2008
d) 2009
e) 2010

Answer the following questions based on your experience from the most recent training course you have taken.

3. **Since the date you completed the most recent training course, are you still...**

…in the same emergency response role?
a) Yes
b) No

…working at the same organization?

a) Yes
b) No

Please rate your agreement or disagreement with the following statements related to your general reaction to the most recent training course you took from CDC DSNS.

Overall reaction to the course	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	N/A
5. Overall, the training course met my expectations.						
6. The in-class lectures helped me understand the materials being presented in the training.						
7. The in-class group discussions helped me understand the materials being presented in the training.						
8. The hands-on components helped me remember the skills I learned from the training.						
9. Based on my experience with this training session, I would probably attend another training course from CDC DSNS.						

10. **Please indicate any comments about your overall reaction to the course:**

Please rate your agreement or disagreement with the following statements related to the content of the training course you most recently took from CDC DSNS.

Course content	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	N/A
11. The topics discussed were relevant to my response role.						
12. The topics discussed were relevant to my organization.						
13. The materials provided were useful resources for my response role.						
14. My performance in emergency response was improved by attending this training course.						

15. **Please indicate any comments about the content of the course:**

16. **How much knowledge about the course material do you think you *had before attending* this training course?**

f) No knowledge prior to training
g) Very little knowledge
h) Some knowledge
i) A lot of knowledge
j) A great deal of knowledge

17. **How much knowledge about the course material do you think you *gained during* this training course?**

k) No new knowledge
l) Very little knowledge
m) Some knowledge
n) A lot of knowledge
o) A great deal of knowledge

18. **Currently, approximately how much knowledge about the course material do you think you still *remember from* this training course?**

p) No new knowledge
q) Very little knowledge
r) Some knowledge
s) A lot of knowledge
t) A great deal of knowledge

19. **To what degree do you think you applied the knowledge and skills learned from this training course to your response role?**

f) None at all
g) Very little application of knowledge and skills
h) Some application of knowledge and skills
i) A lot of knowledge and skills applied
j) A great deal of knowledge and skills applied

20. **In general, how often have you used the knowledge and skills that you obtained from the training for your response role?**

e) Never
f) Sometimes
g) Frequently
h) Always

21. **How significant do you think the training was in changing the way you perform in your response role today?**

f) Very significant

g) Somewhat significant
h) Significant
i) Not very significant
j) Not at all significant

22. **How significant do you think your new knowledge and skills have been to your organization's response mission?**
f) Very significant
g) Somewhat significant
h) Significant
i) Not very significant
j) Not at all significant

23. **After attending the training course, were there any emergency situations or events that arose in which you were able to apply the knowledge and skills you learned?**
c) Yes, please briefly describe:
d) No

24. **Did the knowledge and skills gained from this training course allow you to respond more effectively to the situation indicated in the previous question?**
d) Yes
e) No
f) Maybe

25. **Did your experience with this training course lead you to want to make changes to your organization's response plans, Standard Operation Procedures, processes, etc.?**
d) Yes
e) No
f) Maybe

26. **Did you do anything differently or apply anything new to your response role or your organization's response capabilities that you learned from this training course?**
c) Yes
d) No

27. **How long after completing this training course did you apply the action item(s) indicated in the previous question?**
f) Immediately
g) Approximately within 1-3 months
h) Approximately within 3-6 months
i) Approximately within 6-12 months
j) Approximately more than 1 year
k) Approximately more than 2 years

l) Other, please indicate:

28. **In the process of implementing the action items you previously indicated, did you encounter any organizational *challenges* that made it difficult?**
c) Yes
d) No

29. **Did you encounter any organizational assistance or support that made the process easier?**
a) Yes
b) No

30. **Have you taken any of the following actions as a result from taking this training course? (Select all that apply.)**
h) Developed an all-hazards emergency response plan
i) Updated an all-hazards emergency response plan
j) Planned strategic sites for Receiving, Staging, and Storing
k) Planned sites for possible Points of Dispensing (POD)
l) Conducted an exercise for Points of Dispensing (POD)
m) Conducted a real event for Points of Dispensing (POD)
n) Other, please indicate:

31. **Do you think this training course helped you do a better job in completing the action(s) you selected in the previous question?**
d) Yes
e) No
f) Maybe

32. **What are you *doing currently* in your response role that you did not do before attending this training course?**

33. **What are you *not doing currently* in your response role that you did before attending this training course?**

34. **What did you find *most effective* about this training experience?**

35. **What did you find *least effective* about this training experience?**

36. **Based on your knowledge and work experience, what other topics or activities do you think should be included to make this training more effective?**

37. **What other comments, observations, and/or suggestions can you share?**

Now we would like you to complete a short knowledge test about the Strategic National Stockpile Preparedness Training Course.

To help you remember, the overall objectives for this course are: to provide information and train federal, state, and local planners and officials on how to best use and manage SNS assets in response to a terrorist attack, natural disaster, or technological accident.

38. **The Strategic National Stockpile (SNS) is a national repository of medicine and medical supplies that is designed for delivery to state and local public health agencies in the event of a biological and/or chemical terrorism incident anywhere, at anytime within the U.S.**
a) true
b) false

39. **The Division of Strategic National Stockpile (SNS) is committed to:**
a) deliver medical supplies within 12 hours after authorization to deploy
b) provide support for as long as it is needed
c) update inventory in stock to ensure it supports the needs of states
d) coordinate with Congress for funding
e) all of the above

40. **Select the following statement(s) that best describe how Division of Strategic National Stockpile responds to an emergency event:**
a) provides rapid delivery of broad spectrum of medical supplies when the threat is unknown
b) coordinates with nongovernmental agencies to provide volunteer support
c) secures immediate funding from Congress to assist with the response
d) b & c
e) all of the above

41. **Select the following statement(s) that best describe a 12-hour Push Package:**
a) is in pre-packaged, transport-ready, color coded containers
b) contains all the different types of vaccines the SNS has
c) is delivered to the multiple reception points designated by the state
d) all the above

42. **In general, the federal government is responsible for transporting SNS assets to the state designated RSS site, the state is responsible for receiving the assets and distribution to PODs and treatment sites, and local jurisdictions are responsible for dispensing the assets.**
a) true
b) false

43. **When receiving the 12-hour Push Package, it is important to:**
a) activate the Receiving, Storing and Staging (RSS) warehouse and brief warehouse crew on the implementation plan
b) designate receiving, staging, and shipping areas
c) ensure that all expected containers are received
d) position the containers according to the plan
e) all of the above
f) none of the above

44. **The "head of household" concept in POD operations allows for:**
a) mail service delivery of one bottle of pills per each house
b) the head of household can select who will pick up medications for themselves and their family members
c) the head of a household can pick up medications for their family members
d) a & b
e) a & c

45. **Emergency Use Authorization (EUA) allows "...the use of an unapproved medical product or an unapproved use of an approved medical product during a declared emergency involving a heightened risk of attack on the public..." The authority to issue an EUA rests at what level of government?**
a) state
b) county
c) federal
d) no government level - physicians can authorize

46. **Select the following statement(s) that best describe a "closed POD":**
a) a location where medications are dispensed to a specific population group
b) a POD that is no longer in operation
c) a POD that is not open to people without a current state issued drivers license
d) a method to decrease the number of people going to "open" PODs
e) a & d

47. **The label of a drug must have information according to the federal law including (but not limited to):**
a) name of drug, expiration date, and direction for use
b) name and place of the manufacturer/distributor
c) quantity of contents
d) lot number
e) all of the above
f) none of the above

48. **Emergency Investigational New Drug (IND) can best be described as:**
a) physicians prescribing drugs "off label" to respond to a public health emergency

b) a paperwork-free process that allows new drugs to be used in certain emergency situations
c) allows the FDA to authorize use of an experimental drug in an emergency situation
d) all of the above
e) none of the above

49. **The primary goal of the public information and communication (PIC) campaign is to inform the public, the media, partners and stakeholders about the risks associated with the real or apparent threat to:**
a) reduce fear
b) mobilize the public to go to and get through dispensing sites
c) educate the public about medication they may receive
d) provide follow-up health campaigns post-event
e) all of the above
f) none of the above

50. **Select the following statement that best describes "distribution networks":**
a) the way that SNS assets flow from state RSS facility to local Points of Dispense and treatment centers
b) the geographic connection between POD locations for coordination of distribution operations
c) must contain intermediate distribution nodes to be considered a proper distribution network
d) the media networks needed to tell the population about how the state is distributing the medical supplies
e) all of the above

51. **Common elements in planning to maximize volunteer efforts include:**
a) designate a state volunteer coordinator and staff
b) a recruitment program that draws from appropriate community resources and maintains accurate records on potential volunteers
c) an effective training program for all volunteers to regularly exercise volunteers to maintain interest and skill levels
d) an evaluation mechanism to assess volunteer performance and program effectiveness post event or post exercise
e) all of the above
f) none of the above

52. **The four basic functional areas of a POD are:**
a) intake, screening, dispensing and exit
b) security, screening, dispensing, and monetary reimbursement
c) screening, dispensing, educate, and exit
d) intake, dispensing, screening, and monetary reimbursement

53. **In an anthrax attack, the public is directed to go to a staging site. At the site, responders conduct a quick screening to determine if anyone has symptoms. Those without symptoms are directed to get on a bus that will take them to a POD. This is an example of a:**
a) mega POD operation
b) non-segmented POD
c) segmented POD
d) staging site POD
e) c & d

54. **Which one listed below is NOT an alternate method of dispensing?**
a) closed PODs
b) drive through PODs
c) direct delivery through the SNS ordering website
d) none...all of the answers above are alternate methods
e) all...all of the answers above are alternate methods

55. **POD site selection criteria may include:**
a) familiar sites in the community (voting locations, school, churches) and geographically dispersed
b) service by mass transit
c) adequate parking space
d) able to be secured
e) all of the above
f) none of the above

56. **A mass prophylaxis plan should consider two basic concepts for dispensing operations. Those concepts are generally referred to as the "pull" and "push" methods. The push method is when people come to where the medications are, and the pull method is when the medications are brought to where the people are.**
a) true
b) false

57. **PODs should use ICS methods of organization for their operations.**
a) true
b) false

58. **Some of the responsibilities of a POD manager include:**
a) set-up and operate the POD according to state/regional or local plan
b) responsible for information flow and reporting requirements
c) authorize changes in planning and coordinates the activities of the management staff
d) none of the above
e) all of the above

Now we would like you to complete a short knowledge test about the Mobile Preparedness Training Course.

To help you remember, the course objectives are: to provide state, local and tribal officials with the knowledge, skills, and tools necessary to receive, distribute, and dispense strategic national stockpile assets.

59. **Select the following statement(s) that best describe a 12-hour Push Package:**
a) pre-packaged and in transport-ready containers that can be delivered to anywhere in the country within 12 hours or less after release authority
b) contains specific items when delivered to the emergency site
c) contains sufficient antibiotics to begin individual, 10-day regimens for over 400,000 people
d) is delivered to the single reception point that a state designates
e) a, c & d
f) b & c

60. **What items are NOT contained in a 12-hour Push Package?**
a) airway management supplies
b) portable ventilators
c) antibiotics
d) intravenous supplies
e) all of the above

61. **When receiving the 12-hour Push Package, it is important to:**
a) activate the Receiving, Storing, and Staging (RSS) warehouse and brief warehouse crew on the implementation plan
b) designate receiving, staging, and shipping areas
c) ensure that all expected containers are received
d) position the containers according to the RSS plan
e) all of the above
f) none of the above

62. **A Receiving, Storing, and Staging facility must have a loading dock to receive SNS assets.**
a) true
b) false

63. **Managed inventory items that follow a 12-hour Push Package are on pallets and not in containers.**
a) true
b) false

64. **The main purpose of mass antibiotic dispensing operations is/are too:**
a) provide medication to *x* number of population in a *x* amount of time to decrease illnesses
b) provide information about the threat or the emergency event that is occurring
c) provide free food, medications, and information about the emergency event to anyone who is interested
d) a & b
e) a & c

65. **What issues should be considered when planning a dispensing campaign?**
a) notification and recall of critical infrastructure
b) prophylaxis of critical infrastructure and families
c) establishing points of dispensing for medication distribution
d) notification of the public about the emergency event and what they should do to prevent getting sick
e) all of the above
f) none of the above

66. **Select the following statement that best describes the "Push" method for dispensing planning:**
a) bringing people to where the medications are
b) brining the medications to where people are
c) pushing information to the media about the event

67. **The "head of household" concept in POD operations allows for:**
a) mail service delivery of one bottle of pills per each house
b) the head of household can select who will pick up medications for themselves and their family members
c) the head of a household can pick up medications for their family members
d) b & c
e) all of the above

68. **Select the following statement(s) that best describe a "closed POD":**
a) a location where medications are dispensed to a specific population group
b) a POD that is no longer in operation
c) a POD that is not open to people without a current state issued drivers license
d) a method to decrease the number of people going to "open" PODs
e) all of the above

69. **A POD that receives customers at a staging area, does an initial screening, then puts them on a bus to go to another location where dispensing will happen is an example of a:**
a) non-segmented POD

b) segmented POD
c) multi-directional POD
d) a & c
e) none of the above

70. **Which one listed below is NOT an alternate method of dispensing?**
a) closed PODs
b) drive through PODs
c) direct delivery through the SNS ordering website
d) none...all the answers above are alternate methods

71. **POD site selection may include:**
a) familiar site in the community and geographically dispersed
b) service by mass transit
c) adequate parking space
d) secured
e) all of the above

72. **For mass prophylaxis operations, dispensing is defined as getting the pills in the people. Distribution is defined as moving the SNS assets from the state RSS site to the PODs or treatment centers.**
a) true
b) false

73. **The four basic functional areas of a POD are:**
a) intake, screening, dispensing, and exit
b) security, screening, dispensing, and monetary reimbursement
c) screening, dispensing, educate, and exit
d) intake, dispensing, screening, and monetary reimbursement
e) none of the above

74. **Once the state signs for the SNS assets at the RSS warehouse, responsibility for the security of those assets belongs to:**
a) the U.S. Marshal Service
b) the Department of Homeland Security
c) state law enforcement activity
d) local law enforcement activity
e) all of the above

75. **Three sources for volunteers for mass prophylaxis operations are the American Red Cross, faith-based organizations, and fraternal organizations.**
a) true
b) false

76. **Just-In-Time Training is a critical part of POD operations, as it:**
a) supplements periodic trainings and exercises with materials that will be used in the POD
b) trains specific tasks and duties for a specific event
c) shortens time between learning and application
d) builds into POD set up time schedule
e) all of the above
f) none of the above

77. **The primary goal of the public information and communication (PIC) campaign is to inform the public, the media, partners and stakeholders about the risks associated with the real or apparent threat to:**
a) reduce fear
b) mobilize the public to go to and get through dispensing sites
c) educate the public about medication they may receive
d) all of the above
e) none of the above

78. **What are some messages that will help move people to the dispensing site?**
a) provide event-specific information
b) provide information about "what is happening?"
c) provide information about "who is affected?"
d) provide information about "what is being done?"
e) all of the above

Now we would like you to complete a short knowledge test about the Mass Antibiotic Dispensing Training Course.

To help you remember, the course objectives are: to provide Point of Dispensing managers, local and state planners, and POD staff members the knowledge, skills, and tools necessary to dispense SNS medical countermeasures. At the completion of training, the course participants will be able to determine how to receive and handle SNS assets in a dispensing site during a public health emergency.

79. **The Strategic National Stockpile (SNS) is a national repository of medicine and medical supplies that is designed for delivery to state and local public health agencies in the event of a biological and/or chemical terrorism incident anywhere, at anytime within the U.S.**
a) true
b) false

80. **The Division of Strategic National Stockpile (SNS) is committed to:**
a) deliver medical supplies within 12 hours of authorization to deploy
b) provide support for as long as it is needed
c) coordinate with Congress for funding
d) all of the above
e) a & b

81. **Select the following statement(s) that best describe how the Division of Strategic National Stockpile responds to an emergency event:**
a) provides rapid delivery of broad spectrum of medical supplies when the threat is unknown
b) provides large shipments of specific medical supplies when a threat is known
c) provides technical responders to assist with management and coordination of SNS assets
d) a, b & c
e) none of the above

82. **Select the following statement(s) that best describe a 12-hour Push Package:**
a) pre-packaged and in transport-ready containers that can be delivered to anywhere in the country within 12 hours or less in an emergency event after release is authorized
b) contains all the different types of vaccines the SNS has
c) contains all the paperwork a city needs to dispense medications
d) is delivered to the multiple reception points designated by the state
e) all of the above

83. **The main purpose of mass antibiotic dispensing operations is/are to:**
a) provide medication to *x* number of population in a *x* amount of time to decrease the rise of illnesses
b) provide information about the threat or the emergency event that is occurring
c) provide free food, medications, and information about the emergency event to anyone who is interested
d) a & b
e) a & c

84. **What issues should be considered when planning a dispensing campaign?**
a) notification and recall of critical infrastructure
b) prophylaxis of critical infrastructure and families
c) establishing points of dispensing for medication distribution
d) notification of the public about the emergency event and what they should do to prevent getting sick
e) all of the above
f) none of the above

85. **In general, the federal government is responsible for transporting SNS assets to the state designated RSS site, the state is responsible for receiving the assets and distribution to PODs and treatment sites, and local jurisdictions are responsible for dispensing the assets.**
a) true
b) false

86. **The "head of household" concept in POD operations allows for:**
a) mail service delivery of one bottle of pills per each house
b) the head of household can select who will pick up medications for themselves and their family members
c) the head of a household can pick up medications for their family members
d) b & c

87. **The four basic areas of a POD set up, in sequential order are:**
a) intake, screening, dispensing, and exit
b) security, screening, dispensing, and monetary reimbursement
c) screening, dispensing, educate, and exit
d) intake, dispensing, screening, and monetary reimbursement
e) all of the above

88. **A POD can be designed as:**
a) non-segmented
b) segmented
c) multi-directional
d) a & b
e) a, b & c

89. **Select the following statement(s) that best describes the "Push methods" of dispensing:**
a) bring people to where the medications are
b) bring the medications to where the people are
c) mail the medications to where the people live

90. **Which one listed below is NOT an alternate method of dispensing?**
a) closed PODs
b) drive through PODs
c) direct delivery through the SNS ordering website
d) none of the answers above are alternate methods

91. **Select the following statement(s) that best describe possible action items when establishing a POD:**
a) decide whether the POD will utilize the Push or Pull method
b) establish memoranda of agreement with the facility that will be used for a POD

c) decide on the locations and hours of operation for a POD
d) decide how to reach special needs or at risk populations during a dispensing event
f) all of the above

92. **PODs should use ICS methods of organization for their operations.**
a) true
b) false

93. **Some of the responsibilities of a POD manager include:**
a) set-up and operate the POD according to state/regional or local plan
b) responsible for information flow and reporting requirement
c) authorize changes in planning and coordinates the activities of the staff
d) none of the above
e) all of the above

94. **In an anthrax attack, the public is directed to go to a staging site. At the site, responders conduct a quick screening to determine if anyone has symptoms. Those without symptoms are directed to get on a bus that will take them to a POD. This is an example of a:**
a) mega POD operation
b) non-segmented POD
c) segmented POD
d) staging site POD
e) b & d

95. **Common elements in planning to maximize volunteer efforts include:**
a) designate a state volunteer coordinator and staff
b) a recruitment program that draws from appropriate community resources and maintains accurate records on potential volunteers
c) an effective training program for all volunteers to regularly exercise volunteers to maintain interest and skill levels
d) an evaluation mechanism to assess volunteer performance and program effectiveness post event or post exercise
e) all of the above
f) none of the above

96. **The primary goal of the public information and communication (PIC) campaign is to inform the public, the media, partners and stakeholders about the risks associated with the real or apparent threat to:**
a) reduce fear
b) mobilize the public to go to and get through dispensing sites
c) educate the public about medications they may receive
d) provide follow-up health campaigns post event
e) all of the above

97. **What are some messages that will help move people to the dispensing site?**
a) provide event-specific information
b) provide information about "what is happening?"
c) provide information about "who is affected?"
d) provide information about "what is being done?"
e) all of the above
f) none of the above

98. **What are some considerations for a media visit to an operational POD during an emergency event?**
a) designate an area for media at the POD
b) identify a person responsible for escorting the media through the POD
c) coordinate with the appropriate public information officer (PIO)
d) identify media policies in advance before the event occurs
e) all of the above
f) none of the above

99. **The label of a drug must have information according to the federal law including (but not limited to):**
a) name of drug, expiration date, and direction for use
b) name and place of the manufacturer/distributor
c) quantity of contents
d) lot number
e) all of the above

Finally, to help us interpret these results, there are just a few more questions about your background.

100. **What state is your job location?**

101. **If you work for a government agency, at which level of government do you work?**
h) City
i) County
j) Tribal
k) Regional
l) State
m) Federal
n) I do not work for a government agency

102. **What type of agency do you represent?**
i) Emergency Management
j) Public Health

k) Law Enforcement
l) Military
m) Hospital/Treatment Center
n) Indian Health Service
o) Tribal or Intertribal
p) Other (please indicate):

103. **How long have you been working at your current agency?**
g) Less than 1 year
h) 1 - 5 years
i) 5 - 10 years
j) 10 - 15 years
k) 15 - 20 years
l) 20+ years

104. **How long have you been working in your current position?**
g) Less than 1 year
h) 1 - 5 years
i) 5 - 10 years
j) 10 - 15 years
k) 15 - 20 years
l) 20+ years

105. **How long have you been working in an emergency response area (either Strategic National Stockpile area or other)?**
m) Less than 1 year
n) 1 - 5 years
o) 5 - 10 years
p) 10 - 15 years
q) 15 - 20 years
r) 20+ years

106. **Where would you work during an emergency response? (Select all that apply.)**
a) Point of Dispensing
b) State of Local Emergency Operations Center
c) Receipt, Store, and Distribute Facility
d) Treatment Center
e) Reservations/Tribal Lands
f) Other (please indicate):

107. **What is your primary function in an emergency response?**
h) Planner
i) Supervisor/Manager
j) Coordinator
k) Dispenser

l) Inventory Management
m) Volunteer
n) Other (please indicate):

108. **Has your *organization* completed any of the following actions? (Select all that apply.)**
h) Developed an all-hazard emergency response plan
i) Recently updated an all-hazard emergency response plan
j) Planned strategic sites for Receiving, Staging, and Storing
k) Planned sites for possible points of dispensing
l) Conducted an exercise for points of dispensing
m) Conducted a real event for points of dispensing
n) Other (please indicate):

109. **What is the highest level of education you have completed?**
g) High School Graduate
h) Associates Degree
i) Bachelors Degree
j) Masters Degree (MBA, MPH, etc)
k) Doctoral Degree (JD, MD, or PhD)
l) Other (please indicate):

110. **What is your gender?**
c) Male
d) Female

111. **What age group best describes you?**
f) 18 - 29 years of age
g) 30 - 39 years of age
h) 40 - 49 years of age
i) 50 - 59 years of age
j) 60 years of age or older

112. **Are you Hispanic or Latino?**
d) Yes
e) No
f) Don't know / Not sure

113. **Which of the following best describes you? (Check all that apply)**
g) White
h) Black or African American
i) Asian
j) Native Hawaiian or Pacific Islander
k) Alaskan Native or American Indian
l) Other (please indicate):